Feature Support

Cisco IOS software is packaged in feature sets that consist of software images that support specific platforms. The feature sets available for a specific platform depend on which Cisco IOS software images are included in a release. Each feature set contains a specific set of Cisco IOS features.

Caution Cisco IOS images with strong encryption (including, but not limited to 168-bit (3DES) data encryption feature sets) are subject to U.S. government export controls and have limited distribution. Strong encryption images to be installed outside the United States are likely to require an export license. Customer orders may be denied or subject to delay because of U.S. government regulations. When applicable, the purchaser/user must obtain local import and use authorizations for all encryption strengths. Please contact your sales representative or distributor for more information, or send an e-mail to export@cisco.com.

The feature set tables have been removed from the Cisco IOS Release 12.4T release notes to improve the usability of the release notes documentation. The feature-to-image mapping that was provided by the feature set tables is available through Cisco Feature Navigator.

Cisco Feature Navigator is a web-based tool that enables you to determine which Cisco IOS software images support a specific set of features and which features are supported in a specific Cisco IOS image. You can search by feature or by feature set (software image). Under the release section, you can compare Cisco IOS software releases side by side to display both the features unique to each software release and the features that the releases have in common.

Cisco Feature Navigator is updated regularly when major Cisco IOS software releases and technology releases occur. For the most current information, go to the Cisco Feature Navigator home page at the following URL:

http://www.cisco.com/go/cfn

For frequently asked questions about Cisco Feature Navigator, see the FAQs at the following URL:

http://www.cisco.com/support/FeatureNav/FNFAQ.html

Determining Which Software Images (Feature Sets) Support a Specific Feature

To determine which software images (feature sets) in Cisco IOS Release 12.4T support a specific feature, go to the Cisco Feature Navigator home page and perform the following steps.

Step 1 From the Cisco Feature Navigator home page, click **Search by feature**.

Step 2 To find a feature, use either "Search by full or partial feature name" or "Browse features in alphabetical order." Either a list of features that match the search criteria or a list of features that begin with the number or letter chosen from the ordered list will be displayed in the Features available text box on the left side of the web page.

Step 3 Choose a feature from the Features available text box, and click the **Add** button to add a feature to the Features selected text box on the right side of the web page.

Note To learn more about a feature in the list, click the Show Description(s) button below the Features available text box.

Repeat this step to add features. A maximum of 20 features can be chosen for a single search.

Step 4 Click **Continue** when you are finished choosing features.

Step 5 From the Major Release drop-down list, choose **12.4T**.

Step 6 From the Release drop-down list, choose the appropriate maintenance release.

Step 7 From the Platform drop-down list, choose the appropriate hardware platform. The "Search Results" table will list all the software images (feature sets) that support the features that you chose.

Determining Which Features Are Supported in a Specific Software Image (Feature Set)

To determine which features are supported in a specific software image (feature set) in Cisco IOS Release 12.4T, go to the Cisco Feature Navigator home page and perform the following steps.

Step 1 From the Cisco Feature Navigator home page, click **Compare Images**, and then **Search by Release**.

Step 2 In the "Find the features in a specific Cisco IOS release, using one of the following methods:" area, choose **12.4T** from the Cisco IOS Major Release drop-down list.

Step 3 Click **Continue**.

Step 4 From the Release drop-down list, choose the appropriate maintenance release.

Step 5 From the Platform drop-down list, choose the appropriate hardware platform.

Step 6 From the Feature Set drop-down list, choose the appropriate feature set. The "Search Results" table will list all the features that are supported by the feature set (software image) that you chose.

Memory Recommendations

The memory recommendation tables have been removed from the Cisco IOS Release 12.4T release notes to improve the usability of the release notes documentation. The memory recommendations that were provided by these tables are available through Cisco Feature Navigator.

Cisco Feature Navigator is a web-based tool that enables you to determine which Cisco IOS software images support a specific set of features and which features are supported in a specific Cisco IOS image. You can search by feature or by feature set (software image). Under the release section, you can compare Cisco IOS software releases side by side to display both the features unique to each software release and the features that the releases have in common.

Cisco Feature Navigator is updated regularly when major Cisco IOS software releases and technology releases occur. For the most current information, go to the Cisco Feature Navigator home page at the following URL:

www.cisco.com/go/fn

For frequently asked questions about Cisco Feature Navigator, see the FAQs at the following URL:

http://tools.cisco.com/ITDIT/CFN/jsp/help.jsp

Determining Memory Recommendations for Software Images (Feature Sets)

To determine memory recommendations for software images (feature sets) in Cisco IOS Release 12.4T, go to the Cisco Feature Navigator home page and perform the following steps.

Step 1 From the Cisco Feature Navigator home page, click **Search by Software/Image Name/Product Code/Platform**.

Step 2 To find the memory recommendations for the latest Cisco IOS release, click the release under the Cisco IOS Quick Pick Latest Release area. For other releases, go to Step 3.

a. Choose **All Platforms** (or a specific platform) from the Platform drop-down list.

b. Choose **All Feature Sets** from the Feature Set drop-down list.

The Search Results table will list all the software images (feature sets) that support the release that you chose, plus the DRAM and flash memory recommendations for each image.

Step 3 If the release is not listed in the Cisco IOS Quick Pick Latest Release area, choose **IOS** from the Software drop-down list, and click **Continue**.

a. Choose a release from the Major Release drop-down list, and click **Continue** again.

b. Choose a specific release from the Release drop-down list.

c. Choose **All Platforms** (or a specific platform) from the Platform drop-down list

d. Choose **All Feature Sets** from the Feature Set drop-down list.

The Search Results table will list all the software images (feature sets) that support the release that you chose, plus the DRAM and flash memory recommendations for each image.

Platform-Specific Information

This section describes the platform-specific information for the Cisco platforms supported by Cisco IOS Release 12.4T. Each section includes memory requirements and supported features. Additional information is provided when applicable.

This information is provided for the platforms described in the following sections:

- Cisco SOHO 90 Series Routers, page 11
- Cisco VG202 and Cisco VG204 Voice Gateways, page 12
- Cisco VG224 Analog Gateways, page 13
- Cisco VGD 1T3 Voice Gateways, page 14
- Cisco Secure Router 500 Series, page 15
- Cisco Unified Communications 500 Series, page 17
- Cisco 800 Series Routers, page 18
- Cisco 1700 Series Routers, page 24
- Cisco 1800 Series Routers (Fixed Configuration and Modular), page 34
- Cisco 1805 Cable Router, page 38
- Cisco IAD2430 Series, page 39
- Cisco 2600XM Series and Cisco 2691 Modular Access Routers, page 42
- Cisco 2800 Series Routers, page 50
- Cisco 3200 Series Rugged Integrated Service Routers, page 58
- Cisco 3600 Series Routers, page 60
- Cisco 3700 Series Routers, page 68
- Cisco 3800 Series Routers, page 73
- Cisco AS5350 and Cisco AS5350XM Universal Gateways, page 82
- Cisco AS5400, Cisco AS5400HPX, and AS5400XM Universal Gateways, page 84
- Cisco AS5850 Universal Gateways, page 86
- Cisco Catalyst 6000/Cisco 7600 Multiprocessor WAN Application Module, page 88
- Cisco Catalyst 6500/Cisco 7600 Communication Media Module, page 89
- Cisco 7000 Series Routers, page 92
- Cisco 7600 Service and Application Module for IP (SAMI), page 93
- Cisco IGX 8400 Series URM, page 94
- Cisco MGX 8850 Route Processor Modules (RPM-PR and RPM-XF), page 97
- Cisco Signaling Link Terminals, page 98

Cisco SOHO 90 Series Routers

This section contains the following sections with information that is specific to the Cisco SOHO 90 series routers:

- Memory Recommendations, page 11
- Supported Hardware, page 11
- Feature Support, page 11

Memory Recommendations

For memory recommendations for the Cisco SOHO 90 series routers in Cisco IOS Release 12.4T, see the "Memory Recommendations" section on page 8.

Supported Hardware

Cisco IOS Release 12.4T supports the Cisco SOHO 91, Cisco SOHO 96, and Cisco SOHO 97 routers.

The Cisco SOHO 90 series comprises the Cisco SOHO 91 Ethernet broadband router, the Cisco SOHO 96 asymmetric digital subscriber line (ADSL) over ISDN secure broadband router, and the Cisco SOHO 97 ADSL broadband router. The Cisco SOHO 91 Ethernet broadband router has an Ethernet WAN port for use with an external DSL or cable modem. The Cisco SOHO 96 router has an integrated ADSL modem that supports ADSL over ISDN lines. An ADSL modem is integrated into the Cisco SOHO 97 ADSL broadband routers. The Cisco SOHO 97 router supports ADSL over Plain Old Telephone Service (POTS). The routers also provide the following key hardware features:

- Connection to an ADSL network through an ADSL port
- Ability to be stacked or mounted on a wall
- Locking power connectors and a Kensington-compatible locking slot

For detailed descriptions of the new hardware features, see the "New and Changed Information" section on page 101.

For additional information about supported hardware for this platform and release, see the Cisco Software Advisor at the following location:

http://tools.cisco.com/Support/Fusion/FusionHome.do

Feature Support

For feature support in Cisco IOS Release 12.4T, see the "Feature Support" section on page 7.

Cisco VG202 and Cisco VG204 Voice Gateways

This section contains the following sections with information that is specific to the Cisco VG202 and Cisco VG204 analog voice gateways:

- Introduction, page 12
- Memory Recommendations, page 12
- Supported Hardware, page 12
- Feature Support, page 12

Introduction

The Cisco VG202 and Cisco VG204 voice gateways are analog voice gateways for use in the service provider, commercial and Enterprise markets. The Cisco VG202 and Cisco VG204 voice gateways provide 2 and 4 FXS analog voice interfaces to connect to analog phones, fax machines and analog voice modems.

Memory Recommendations

For memory recommendations for the Cisco VG202 and VG204 Voice Gateways in Cisco IOS Release 12.4T, see the "Memory Recommendations" section on page 8.

Supported Hardware

Cisco IOS Release 12.4 supports the Cisco VG202 and Cisco VG204 voice gateways.

For detailed descriptions of the new hardware features, see the "New and Changed Information" section on page 101.

For additional information about supported hardware for this platform and release, see the Cisco Software Advisor at the following location:

http://tools.cisco.com/Support/Fusion/FusionHome.do

Feature Support

For feature support in Cisco IOS Release 12.4T, see the "Feature Support" section on page 7.

Cisco VG224 Analog Gateways

This section contains the following sections with information that is specific to the Cisco VG224 analog gateways:

- Introduction, page 13
- Memory Recommendations, page 13
- Supported Hardware, page 13
- Feature Support, page 13

Introduction

The Cisco VG224 series is a family of analog gateways. The Cisco VG224 has a 24-port Foreign Exchange Station (FXS) through an RJ-21 connector and two 10/100BASE-T interfaces.

Memory Recommendations

For memory recommendations for the Cisco VG224 Analog Gateway in Cisco IOS Release 12.4T, see the "Memory Recommendations" section on page 8.

Supported Hardware

Cisco IOS Release 12.4 supports the Cisco VG224 analog gateway.

For detailed descriptions of the new hardware features, see the "New and Changed Information" section on page 101.

For additional information about supported hardware for this platform and release, see the Cisco Software Advisor at the following location:

http://tools.cisco.com/Support/Fusion/FusionHome.do

Feature Support

For feature support in Cisco IOS Release 12.4T, see the "Feature Support" section on page 7.

Cisco VGD 1T3 Voice Gateways

This section contains the following sections with information that is specific to the Cisco VG224 analog gateways:

- Introduction, page 14
- Memory Recommendations, page 14
- Supported Hardware, page 14
- Feature Support, page 14

Introduction

The Cisco VGD 1T3 is a high density voice gateway with up to one Channelized T3 (CT3) of voice over IP (VoIP) capacity with support for Cisco Unified Communications Manager and Cisco Voice Portal applications with Media Gateway Control Protocol (MGCP). The Cisco VGD 1T3 Voice Gateway offers unparalleled capacity in only two rack units (RUs) and provides best-of-class voice and fax services.

Memory Recommendations

For memory recommendations for the Cisco VGD-1T#224 Analog Gateway in Cisco IOS Release 12.4T, see the "Memory Recommendations" section on page 8.

Supported Hardware

Cisco IOS Release 12.4(22)T supports the Cisco VGD 1T3 platform.

For detailed descriptions of the new hardware features, see the "New and Changed Information" section on page 101.

For additional information about supported hardware for this platform and release, see the Cisco Software Advisor at the following location:

http://tools.cisco.com/Support/Fusion/FusionHome.do

Feature Support

For feature support in Cisco IOS Release 12.4T, see the "Feature Support" section on page 7.

Cisco Secure Router 500 Series

This section contains the following sections with information that is specific to the Cisco secure router 500series:

- Introduction, page 15
- Memory Recommendations, page 15
- Supported Hardware, page 15
- Feature Support, page 16

Introduction

The Cisco Secure Router 520 Series routers are designed for small businesses with up to 50 users and teleworkers who want secure connectivity to corporate LANs and to the Internet. These routers provide advanced security features that include secure Virtual Private Network (VPN) access and comprehensive threat defense with Cisco IOS Firewall, Intrusion Prevention Solution (IPS), and URL filtering. The Cisco Secure Router 520 Series routers also provide dynamic routing and advanced quality of service (QoS) features. They are available in two Ethernet models and four DSL models.

Ethernet Models:

- Cisco Secure Router 520 Ethernet-to-Ethernet (without wireless functionality).
- Cisco Secure Router 520 Ethernet-to-Ethernet Wireless (with wireless functionality).

DSL Models:

- Cisco Secure Router 520 ADSL-over-POTS (without wireless functionality).
- Cisco Secure Router 520 ADSL-over-POTS Wireless (with wireless functionality).
- Cisco Secure Router 520 ADSL-over-ISDN (without wireless functionality).
- Cisco Secure Router 520 ADSL-over-ISDN Wireless (with wireless functionality).

Memory Recommendations

For memory recommendations for the Cisco secure router 500series in Cisco IOS Release 12.4T, see the "Memory Recommendations" section on page 8.

Supported Hardware

Cisco IOS Release 12.4T supports the following Cisco secure router 500series:

- Cisco SR520-FE-K9
- Cisco SR520W-FE-K9
- Cisco SR520-ADSL-K9
- Cisco SR520W-ADSL-K9
- Cisco SR520-ADSLI-K9,
- Cisco SR520W-ADSLI-K9

For detailed descriptions of the new hardware features, see the "New and Changed Information" section on page 101.

For additional information about supported hardware for this platform and release, see the Cisco Software Advisor at the following location:

http://tools.cisco.com/Support/Fusion/FusionHome.do

Feature Support

For feature support in Cisco IOS Release 12.4, see the "Feature Support" section on page 7.

Cisco Unified Communications 500 Series

This section contains the following sections with information that is specific to the Cisco unified communications 500 series:

- Introduction, page 17
- Memory Recommendations, page 17
- Supported Hardware, page 17
- Feature Support, page 17

Introduction

The Cisco Unified Communications 500 platform provides voice, data, voicemail, Automated Attendant, video, security, and wireless capabilities while integrating with existing desktop applications such as calendar, e-mail, and customer relationship management (CRM) programs. This platform supports up to 50 users (with expansion capabilities to allow up to 64 phones and voicemail boxes) and flexible deployment options including IP phones, public switched telephone network (PSTN) interfaces, and Internet connectivity.

Memory Recommendations

For memory recommendations for the Cisco UC500 series in Cisco IOS Release 12.4T, see the "Memory Recommendations" section on page 8.

Supported Hardware

Cisco IOS Release 12.4T supports the Cisco UC520.

For detailed descriptions of the new hardware features, see the "New and Changed Information" section on page 101.

For additional information about supported hardware for this platform and release, see the Cisco Software Advisor at the following location:

http://tools.cisco.com/Support/Fusion/FusionHome.do

Feature Support

For feature support in Cisco IOS Release 12.4, see the "Feature Support" section on page 7.

Cisco 800 Series Routers

This section contains the following sections with information that is specific to the Cisco 800 series routers:

- Memory Recommendations, page 18
- Supported Hardware, page 18
- Feature Support, page 19
- Additional Notes for the Cisco 800 Series, page 19

Memory Recommendations

For memory recommendations for the Cisco 800 series routers in Cisco IOS Release 12.4T, see the "Memory Recommendations" section on page 8.

Supported Hardware

Cisco IOS Release 12.4T supports the following Cisco 800 series routers:

- Cisco 815
- Cisco 830 (Cisco 831, Cisco 836, Cisco 837)
- Cisco 850 (Cisco 851, Cisco 857)
- Cisco 861
- Cisco 870 (Cisco 871, Cisco 876, Cisco 877, Cisco 878)
- Cisco 881 (Cisco 881, Cisco 881G, Cisco IAD881F, Cisco IAD881B, Cisco SRST881)
- Cisco 887 (Cisco 887V)
- Cisco 888 (Cisco 888, Cisco 888G, Cisco IAD888F, Cisco IAD888B, Cisco SRST888)

Note In Cisco IOS Release 12.4(11)T, there is a 30%+ increase in CPU utilization that is seen between Cisco IOS Release 12.4(9)T and Cisco IOS Release 12.4(11)T for the Cisco 870 series routers.

Note The Cisco 815 router is supported in Cisco IOS Release 12.4(11)T and Release 12.4(15)T. The Cisco 830 and Cisco 850 series routers are not supported in Cisco IOS Release 12.4(20)T and later releases. The Cisco 861, Cisco 881 series and Cisco 888 series routers are supported in Cisco IOS Release 12.4(20)T and later releases. Cisco 887 series routers are supported in Cisco IOS Release 12.4(24)T.

For detailed descriptions of the new hardware features, see the "New and Changed Information" section on page 101.

For additional information about supported hardware for this platform and release, see the Cisco Software Advisor at the following location:

http://tools.cisco.com/Support/Fusion/FusionHome.do

Feature Support

For feature support in Cisco IOS Release 12.4, see the "Feature Support" section on page 7.

Additional Notes for the Cisco 800 Series

This section contains important information about using the Cisco 800 series routers with Cisco IOS Release 12.4T software.

ADSL2 and ADSL2+ Support

Cisco IOS Release 12.4(4)T introduces ADSL2 and ADSL2+ features for the Cisco 857, Cisco 876 and Cisco 877 routers. For "dsl operating-mode" configuration, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t4/dsl_hwic.htm

caller-id Command

When the **caller-id** command (which appears under "dial-peer" in the configuration commands) is used, the default setting is "off" for Japan and "on" for the United States. This command was introduced in Cisco IOS Release 12.1(2)XF.

DHCP Client Support

To configure the router for Dynamic Host Configuration Protocol (DHCP) client support, perform the following steps:

Step 1 Configure the Bridge Group Virtual Interface (BVI) by entering the **ip address dhcp client-id ethernet0** command.

Specifying the value **client-id ethernet0** causes the MAC address of the Ethernet interface to be used as the client ID when the DHCP request is sent. Otherwise, the MAC address of the BVI is used as the client ID.

Step 2 Configure Network Address Translation (NAT):

a. Configure the BVI by entering the **nat outside** command.

b. Configure the Ethernet interface by entering the **nat inside** command.

c. Create an access list under NAT by entering the **access-list 1 permit** *ip-address* command to match all Ethernet IP addresses.

d. Configure the source list under NAT by entering the **ip nat inside source list 1 interface BVI 1 overload** command.

The following is a sample configuration:

```
Current configuration:
!
version 12.0
no service pad
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname c827
```

```
!
!
ip subnet-zero
ip dhcp excluded-address 10.10.10.1
!
ip dhcp pool SERVER
 network 10.10.10.0 255.255.255.0
 default-router 10.10.10.1
 import all
!
!
!
bridge irb
!
!
!
!
interface Ethernet0
ip address 10.10.10.1 255.255.255.0
no ip directed-broadcast
ip nat inside
!
interface ATM0
no ip address
no ip directed-broadcast
no atm ilmi-keepalive
bundle-enable
hold-queue 208 in
!
interface ATM0.1 point-to-point
no ip directed-broadcast
pvc 1/100
 encapsulation aal5snap
!
bridge-group 1
!
interface ATM0.2 point-to-point
ip address 5.0.0.2 255.0.0.0
no ip directed-broadcast
pvc 1/101
 protocol ip 5.0.0.1 broadcast
 protocol ip 5.0.0.5 broadcast
 encapsulation aal5snap
!
!
interface BVI1
ip address dhcp client-id ethernet0
no ip directed-broadcast
ip nat outside
!
ip nat inside source list 1 interface BVI 1 overload
ip classless
ip route 0.0.0.0 0.0.0.0 BVI1
no ip http server
!
access-list 1 permit 10.10.10.0 0.0.0.255
bridge 1 protocol ieee
bridge 1 route ip
!
voice-port 1
timing hookflash-in 0
!
voice-port 2
timing hookflash-in 0
```

```
!
voice-port 3
timing hookflash-in 0
!
voice-port 4
timing hookflash-in 0
!
!
line con 0
exec-timeout 0 0
transport input none
stopbits 1
line vty 0 4
password lab
login
!
scheduler max-task-time 5000
end
```

Downloading Images

Delete files in the router flash memory before attempting to download new images.

Caution Use the **delete** command, not the **erase** command, to free up space. Entering the **erase** command removes all files, including the configuration.

Flash Memory

Cisco 800 series routers (Cisco 815, Cisco 830, Cisco 850, Cisco 870) use 4 MB of flash memory for storing internal information such as the ROM monitor. Only the remainder of the flash memory is available for storing Cisco IOS images and is displayed by using the **show flash** command. For example, if the router reports 8 MB of flash, the actual amount of onboard flash memory is 12 MB, even though only 8 MB are displayed and available for Cisco IOS image storage.

Cisco 860 series routers use 2 MB of flash memory for storing internal information such as the ROM monitor. There is a separate 128 MB of flash memory available for storing Cisco IOS images and is displayed by using the **show flash** command.

Cisco 880 series routers use 4 MB of flash memory for storing internal information such as the ROM monitor. There is a separate 256 MB of flash memory available for storing Cisco IOS images and is displayed by using the **show flash** command.

Multilink PPP and Interleaving

Multilink PPP fragments large data packets to allow small voice packets to be interleaved between them. However, apart from FIFO queueing, no other kind of output queueing mechanisms are supported with PPP over ATM. Consequently, when multilink PPP is configured on the Cisco 800 series routers, large packets are fragmented, but small voice packets are not interleaved between them.

NAT Support for H.323 Signaling

NAT does not support alerting H.225 messages; therefore, NAT communication cannot be established between router endpoints. NAT support for H.323 signaling is limited to the application NetMeeting.

PPP over AAL5SNAP Encapsulation Support

PPP over AAL5SNAP encapsulation is not supported, although the context-sensitive help mentions that it can be configured.

Cisco 800 Series Router Clock—CSCdp09409

To run IP Security (IPSec) successfully, the Cisco 800 series router clock needs to be set accurately. Cisco 800 series router clocks are set and maintained using Simple Network Time Protocol (SNTP). For best results, set up a Network Time Protocol (NTP) server to periodically send time information messages to Cisco 800 series routers. See the SNTP configuration and command reference documentation for configuration instructions. If you do not have an NTP server, you must reset the Cisco 800 series router clock using the **clock set** command each time you restart the router.

Dial Peer Limitation

The **isdn answer1** and **isdn answer2** commands determine which called telephone numbers, for example, 555-0100 and 555-0199, a Cisco 800 series router can answer. Using these commands limits a router to using the two dial peers that contain the telephone numbers 555-0100 and 555-0199. (When not using these commands, a router can use up to six dial peers.)

Excessive ISDN Line Activation

The following protocols send updates that can cause an ISDN line to be activated excessively, thereby increasing your monthly ISDN line cost:

- IP
- User Datagram Protocol (UDP)
- Internetwork Packet Exchange (IPX)
- Cisco Discovery Protocol (CDP)
- Simple Network Time Protocol (SNTP)

For information on preventing this situation, refer to the *Cisco 800 Series Routers Software Configuration Guide*. This guide contains information on setting up extended access lists to prevent IP, UDP, IPX, and SNTP updates from activating the ISDN line. For CDP, ensure that you enter the **no cdp enable** command to disable CDP.

Hanging During Boot

If an illegal console configuration is issued to the router, the console will fail the power-on self-test (POST) test during boot and cause the router to pause indefinitely. There is no way to recover a unit in this state except by pulling the soldered boot Flash and reburning the boot ROM.

This problem has been resolved in TinyROM version 1.0(3), a downloadable ROM upgrade available from Cisco.com. Please contact Cisco to upgrade to this version or a later version, and prevent this problem from occurring.

Phone Mate Answering Machine Model 9200

A Phone Mate answering machine model 9200 failed to recognize the ringing signal sent by AMD R79 ringing Subscriber Line Interface Card (SLIC). This failure was confirmed by testing against Phone Mate model 3750 and the newer model 9300.

B-Channel Activation

When a call comes in, a B channel is activated. If the amount of traffic on the B channel exceeds a threshold, the other B channel is activated. If the amount of traffic falls below the threshold, one of the B channels is deactivated. The B channel that is initially activated when the call comes in is not necessarily B1, nor is the B channel that is deactivated when the traffic level lessens necessarily B2.

Cisco 1700 Series Routers

This section contains the following sections with information that is specific to the Cisco 1700 series routers:

- Memory Recommendations, page 24
- Hardware Supported, page 24
- Feature Support, page 32
- Additional Notes for the Cisco 1700 Series Routers, page 32

Memory Recommendations

For memory recommendations for the Cisco 1700 series routers in Cisco IOS Release 12.4, see the "Memory Recommendations" section on page 8.

Hardware Supported

Cisco IOS Release 12.4 supports the following Cisco 1700 series routers:

- Cisco 1701—Runs data images only.
- Cisco 1711—Runs data images only.
- Cisco 1712—Runs data images only.
- Cisco 1721—Runs data images only.
- Cisco 1751 and Cisco 1751-V—Runs data and data-plus-voice images.
- Cisco 1760—Runs data and data-plus-voice images.

For detailed descriptions of the new hardware features, see the "New and Changed Information" section on page 101.

For additional information about supported hardware for this platform and release, see the Cisco Software Advisor at the following location:

http://tools.cisco.com/Support/Fusion/FusionHome.do

Cisco 1701

The Cisco 1701 ADSL Security Access Router provides secure and reliable Internet and corporate network connectivity to enterprise small branch offices and small and medium-sized businesses and includes the following features:

- Business Class DSL
- High Availability
- Simplified management and ease of deployment
- Integrated security
- Advanced QoS

The Cisco 1701 router has the following hardware components:

- One ADSLoPOTS WAN port
- One ISDN BRI WAN port

- One 10/100BASE-TX Fast Ethernet port (RJ-45)
- One auxiliary (AUX) port
- One console port
- DRAM memory: 96 MB default, 128 MB maximum
- Flash memory: 32 MB default, 32 MB maximum

Cisco 1711

The Cisco 1711 router provides Internet and intranet access and includes the following features:

- Support for virtual private networking
- Fixed architecture
- Network device integration

The Cisco 1711 router has the following hardware components:

- One autosensing 10/100 Fast Ethernet port, which operates in full- or half-duplex mode (with manual override available)
- One 4-port 10/100BASE-T switch, which operates in full- or half-duplex mode (with manual override available)
- One v.90 analog modem port
- One auxiliary (AUX) port (up to 115.2 kbps asynchronous serial)
- One console port
- VPN Hardware Encryption Module
- Motorola MPC862P PowerQUICC at 100 MHz. The hardware encryption module offloads the processor for encryption and decryption
- One internal expansion slot for support of hardware-assisted services such as encryption (up to T1/E1) and compression
- DRAM memory: 96 MB default, expandable to 128 MB
- Flash memory: 32 MB default, 32 MB maximum
- One security slot that supports Kensington or similar lockdown equipment
- Desktop form factor

Cisco 1712

The Cisco 1712 router provides Internet and intranet access and includes the following features:

- Support for virtual private networking
- Fixed architecture
- Network device integration

The Cisco 1712 router has the following hardware components:

- One autosensing 10/100 Fast Ethernet port, which operates in full- or half-duplex mode (with manual override available)
- One 4-port 10/100BASE-T switch, which operates in full- or half-duplex mode (with manual override available)
- One ISDN BRI S/T port

- One auxiliary (AUX) port (up to 115.2 kbps asynchronous serial)
- One console port
- VPN Hardware Encryption Module
- Motorola MPC862P PowerQUICC at 100 MHz. The hardware encryption module offloads the processor for encryption and decryption
- One internal expansion slot for support of hardware-assisted services such as encryption (up to T1/E1) and compression
- DRAM memory: 96 MB default, expandable to 128 MB
- Flash memory: 32 MB default, 32 MB maximum
- One security slot that supports Kensington or similar lockdown equipment
- Desktop form factor

Cisco 1721

The Cisco 1721 router provides Internet and intranet access and includes the following features:

- Support for virtual private networking
- Modular architecture
- Network device integration

The Cisco 1721 router has the following hardware components:

- One autosensing 10/100 Fast Ethernet port, which operates in full- or half-duplex mode (with manual override available) and supports IEEE 802.1Q VLAN
- Two WIC slots
- One auxiliary (AUX) port (up to 115.2 kbps asynchronous serial)
- One console port
- RISC processor for high-performance encryption
- One internal expansion slot for support of hardware-assisted services such as encryption (up to T1/E1)
- DRAM memory: 64 MB (onboard default), 1 DIMM slot for a total DRAM maximum of 128 MB
- Flash memory: 32 MB default, not expandable
- Desktop form factor

The Cisco 1721 router supports any combination of one or two of the following WAN interface cards (WICs) or multiflex Voice/WAN interface cards (VWICs) (data only), which are shared with the Cisco 1700, Cisco 2600, and Cisco 3600 series routers:

- WIC-1T: one-port high-speed serial (synchronous/asynchronous)
- WIC-2T: two-port high-speed serial (synchronous/asynchronous)
- WIC-2A/S: two-port low-speed serial (synchronous/asynchronous) (up to 128 kbps)
- WIC-1ADSL: one-port ADSL
- WIC-1ADSL-I-DG: one-port ADSLoISDN WAN interface card
- WIC-1ADSL-DG: one-port ADSLoPOTS WIC with dying gasp
- WIC-1B-S/T: one-port ISDN BRI S/T

- WIC-1B-S/T-V3: one-port ISDN WIC (dial and leased line)
- WIC-1B-U-V2: one-port ISDN BRI NT-1 WIC for the Cisco 1700, 2600, 3600, and 3700 series
- WIC-1DSU-56K4: one-port integrated 56/64-kbps 4-wire DSU/CSU
- WIC-1DSU-T1: one-port integrated T1/fractional T1 DSU/CSU
- WIC-1DSU-T1-V2: updated one-port T1/fractional T1 DSU/CSU WIC
- WIC-1ENET: one-port 10BASE-T Ethernet
- WIC-1SHDSL: one-port G.SHDSL
- WIC-1SHDSL-V2
- WIC-1AM: one-port analog modem
- WIC-2AM: two-port analog modem
- WIC-4ESW: four-port Ethernet switch WIC

The following T1/E1 Multiflex VWICs are also supported on the Cisco 1721 for data applications only:

- VWIC-1MFT-E1: one-port RJ-48 multiflex trunk (E1)
- VWIC-2MFT-E1: two-port RJ-48 multiflex trunk (E1)
- VWIC-1MFT-G703: one-port RJ-48 multiflex trunk (G.703)
- VWIC-2MFT-G703: two-port RJ-48 multiflex trunk (G.703)
- VWIC-1MFT-T1: one-port RJ-48 multiflex trunk (T1)
- VWIC2-1MFT-T1/E1
- VWIC2-2MFT-T1/E1
- VWIC2-1MFT-G703
- VWIC2-2MFT-G703
- VWIC-2MFT-T1: two-port RJ-48 multiflex trunk (T1)
- VWIC-2MFT-E1-DI: two-port RJ-48 multiflex trunk (E1) (with drop and insert)
- VWIC-2MFT-T1-DI: two-port RJ-48 multiflex trunk (T1) (with drop and insert)

Cisco 1751

The voice- and data-capable Cisco 1751 router comes in two models, the Cisco 1751 and the Cisco 1751-V. These models provide global Internet and company intranet access, and include the following features:

- VoIP voice-and-data functionality; the router can carry voice traffic (for example, telephone calls and faxes) over an IP network
- Support for Cisco IOS Firewall, Intrusion Detection Systems, IPSec Virtual Private Networks
- Modular architecture
- Network device integration

The Cisco 1751 router has the following hardware components:

- One autosensing 10/100 Fast Ethernet port, which operates in full- or half-duplex mode (with manual override available)
- One voice-only interface card slot—supports a single voice interface card with two ports per card
- Two WAN/VIC slots for either WICs or VICs

- Synchronous serial interfaces on serial WICs
- Asynchronous serial interfaces on serial WICs
- ISDN WICs-ISDN dialup and ISDN leased line (IDSL) at 144 kbps. Encapsulation over ISDN leased line: Frame Relay and PPP
- One auxiliary (AUX) port (up to 115.2 kbps asynchronous serial)
- One console port
- One internal expansion slot—Supports hardware-assisted services such as encryption (up to T1/E1) and compression
- One security slot that supports Kensington or similar lockdown equipment
- DRAM memory—Cisco 1751: 64 MB default, expandable to 128 MB; Cisco 1751-V: 64 MB default, expandable to 128 MB
- Flash memory—Cisco 1751: 32 MB default, nonexpandable; Cisco 1751-V: 32 MB default, nonexpandable
- Desktop form factor

The Cisco 1751 router also supports any combination of one or two of the following WICs, which are shared with the Cisco 1600 series, Cisco 1720, Cisco 2600 series, and Cisco 3600 series routers:

- WIC-1T: one-port high-speed serial (synchronous/asynchronous) (T1/E1)
- WIC-2T: two-port high-speed serial (synchronous/asynchronous) (T1/E1)
- WIC-2A/S: two-port low-speed serial (synchronous/asynchronous) (up to 128 kbps)
- WIC-1ADSL: one-port ADSL WIC
- WIC-1ADSL-I-DG: one-port ADSLoISDN WIC
- WIC-1ADSL-DG: one-port ADSLoPOTS WIC with dying gasp
- WIC-1B-S/T: one-port ISDN BRI S/T interface card
- WIC-1B-S/T-V3: one-port ISDN WIC (dial and leased line)
- WIC-1B-U: one-port ISDN BRI U with integrated NT-1 (WIC-1B-U-V2 replaces WIC-1B-U in Cisco IOS Release 12.3)
- WIC-1B-U-V2: one-port ISDN BRI NT-1 WIC for the Cisco 1700, 2600, 3600, and 3700 series
- WIC-1DSU-56K4: one-port integrated 56/64-kbps 4-wire DSU/CSU
- WIC-1DSU-T1: one-port integrated T1/fractional T1 DSU/CSU
- WIC-1DSU-T1-V2: updated one-port T1/fractional T1 DSU/CSU WIC
- WIC-1ENET: one-port 10BASE-T Ethernet
- WIC-1SHDSL: one-port G.SHDSL WIC
- WIC-1SHDSL-V2
- WIC-1AM: one-port analog modem
- WIC-2AM: two-port analog modem
- WIC-4ESW: four-port Ethernet switch WIC

The following T1/E1 multiflex VWICs are also supported on the Cisco 1751 (and shared with the Cisco 2600 and Cisco 3600 series routers) and can be used for both channelized data and voice applications:

- VWIC-1MFT-E1: one-port RJ-48 multiflex trunk (E1)
- VWIC-2MFT-E1: two-port RJ-48 multiflex trunk (E1)
- VWIC-1MFT-G703: one-port RJ-48 multiflex trunk (G.703)
- VWIC-2MFT-G703: two-port RJ-48 multiflex trunk (G.703)
- VWIC-1MFT-T1: one-port RJ-48 multiflex trunk (T1)
- VWIC2-1MFT-T1/E1
- VWIC2-2MFT-T1/E1
- VWIC2-1MFT-G703
- VWIC2-2MFT-G703
- VWIC-2MFT-T1: two-port RJ-48 multiflex trunk (T1)
- VWIC-2MFT-E1-DI: two-port RJ-48 multiflex trunk (E1) (with drop and insert)
- VWIC-2MFT-T1-DI: two-port RJ-48 multiflex trunk (T1) (with drop and insert)

The Cisco 1751 router supports any combination of one or two of the following VICs, which are shared with the Cisco 2600 and Cisco 3600 series routers:

- VIC-2FXS: two-port FXS voice/fax interface card for voice/fax network module
- VIC-2FXO: two-port FXO voice/fax interface card for voice/fax network module
- VIC-2FXO-EU: two-port FXO voice/fax interface card for Europe
- VIC-2E/M: two-port Ear-and-Mouth (E&M) voice/fax interface card for the voice/fax network module
- VIC-2BRI-NT/TE: two-port VIC—BRI (NT and TE)
- VIC-2FXO-M3: two-port FXO voice/fax interface card for Australia
- VIC-2FXO-M1: two-port FXO voice/fax interface card with battery reversal for North America
- VIC-2FXO-M2: two-port FXO voice/fax interface card with battery reversal for Europe
- VIC-2DID: two-port DID voice/fax interface card
- VIC-4FXS/DID: four-port FXS or DID VIC
- VIC2-2FXS: two-port VIC—FXS
- VIC2-2FXO: two-port VIC—FXO (universal)
- VIC2-2E/M: two-port VIC—E & M
- VIC2-4FXO: four-port VIC—FXO (universal)
- VIC2-2BRI-NT/TE: two-port VIC—BRI (NT and TE)

Cisco 1760

The voice- and data-capable Cisco 1760 router provides global Internet and company intranet access, and includes the following features:

- VoIP voice and data functionality; the router can carry voice traffic (for example, telephone calls and faxes) over an IP network
- Support for Cisco IOS Firewall, Intrusion Detection Systems, and IPSec Virtual Private Networks
- Modular architecture
- Network device integration

The Cisco 1760 router has the following hardware components:

- One autosensing 10/100 Fast Ethernet port, which operates in full- or half-duplex mode (with manual override available)
- Two voice-only interface card slots—Supports a single VIC with two ports per card
- Two WAN/VIC slots for either WICs or VICs
- Synchronous serial interfaces on serial WICs
- Asynchronous serial interfaces on serial WICs
- ISDN WICs—ISDN dialup and IDSL at 144 kbps. Encapsulation over ISDN leased line: Frame Relay and PPP
- One auxiliary (AUX) port (up to 115.2 kbps asynchronous serial)
- One console port
- One internal expansion slot—Supports hardware-assisted services such as encryption (up to T1/E1) and compression
- One security slot that supports Kensington or similar lockdown equipment
- DRAM memory—Cisco 1760: 64 MB default, expandable to 160 MB
- Flash memory—Cisco 1760: 32 MB default, expandable to 64 MB
- Rack-mount form factor

The Cisco 1760 router also supports any combination of one or two of the following WICs, which are shared with the Cisco 1600 series, Cisco 1720, Cisco 2600 series, and Cisco 3600 series routers:

- WIC-1T: one-port high-speed serial (synchronous/asynchronous) (T1/E1)
- WIC-2T: two-port high-speed serial (synchronous/asynchronous) (T1/E1)
- WIC-2A/S: two-port low-speed serial (synchronous/asynchronous) (up to 128 kbps)
- WIC-1DSU-56K4: one-port 4-wire 56-kbps DSU/CSU WIC
- WIC-1ADSL: one-port ADSL WIC
- WIC-1ADSL-I-DG: one-port ADSLoISDN WIC
- WIC-1ADSL-DG: one-port ADSLoPOTS WIC with dying gasp
- WIC-1B-S/T: one-port ISDN BRI S/T
- WIC-1B-S/T-V3: one-port ISDN WIC (dial and leased line)
- WIC-1B-U: one-port ISDN BRI U with integrated NT-1 (WIC-1B-U-V2 replaces WIC-1B-U in Cisco IOS Release 12.3)
- WIC-1B-U-V2: one-port ISDN BRI NT-1 WIC for the Cisco 1700, 2600, 3600, and 3700 series

- WIC-1DSU-56K4: one-port integrated 56/64-kbps 4-wire DSU/CSU
- WIC-1DSU-T1: one-port integrated T1/fractional T1 DSU/CSU
- WIC-1DSU-T1-V2: updated one-port T1/fractional T1 DSU/CSU WIC
- WIC-1ENET: one-port 10BASE-T Ethernet
- WIC-1SHDSL: one-port G.SHDSL WIC
- WIC-1SHDSL-V2
- WIC-1AM: one-port analog modem
- WIC-2AM: Two-port analog modem
- WIC-4ESW: Four-port Ethernet switch WIC

The following T1/E1 multiflex VWICs are also supported on the Cisco 1760 (and shared with the Cisco 2600 and Cisco 3600 series routers) and can be used for both channelized data and voice applications:

- VWIC-1MFT-E1: one-port rj-48 multiflex trunk (E1)
- VWIC-2MFT-E1: two-port RJ-48 multiflex trunk (E1)
- VWIC-1MFT-G703: one-port RJ-48 multiflex trunk (G.703)
- VWIC-2MFT-G703: two-port RJ-48 multiflex trunk (G.703)
- VWIC-1MFT-T1: one-port RJ-48 multiflex trunk (T1)
- VWIC2-1MFT-T1/E1
- VWIC2-2MFT-T1/E1
- VWIC2-1MFT-G703
- VWIC2-2MFT-G703
- VWIC-2MFT-T1: two-port RJ-48 multiflex trunk (T1)
- VWIC-2MFT-E1-DI: two-port RJ-48 multiflex trunk (E1) (with drop and insert)
- VWIC-2MFT-T1-DI: two-port RJ-48 multiflex trunk (T1) (with drop and insert)

The Cisco 1760 router supports any combination of one or two of the following VICs, which are shared with the Cisco 2600 and Cisco 3600 series routers:

- VIC-2FXS: two-port FXS voice/fax interface card for voice/fax network module
- VIC-2FXO: two-port FXO voice/fax interface card for voice/fax network module
- VIC-2FXO-EU: two-port FXO voice/fax interface card for Europe
- VIC-2E/M: two-port E&M voice/fax interface card for voice/fax network module
- VIC2-2BRI-NT/TE: two-port voice interface card—BRI (NT and TE)
- VIC-2FXO-M3: two-port FXO voice/fax interface card for Australia
- VIC-2FXO-M1: two-port FXO voice/fax interface card with battery reversal for North America
- VIC-2FXO-M2: two-port FXO voice/fax interface card with battery reversal for Europe
- VIC-2DID: two-port DID voice/fax interface card
- VIC-4FXS/DID: four-port FXS or DID VIC
- VIC2-2FXS: two-port voice interface card—FXS
- VIC2-2FXO: two-port voice interface card—FXO (universal)

- VIC2-2E/M
- VIC2-4FXO: four-port voice interface card—FXO (universal)
- VIC-2BRI-NT/TE: two-port voice/fax interface card (BRI [NT and TE])
- VPN Module: MOD1700-VPN

Feature Support

For feature support in Cisco IOS Release 12.4, see the "Feature Support" section on page 7.

Additional Notes for the Cisco 1700 Series Routers

This section contains important information about using the Cisco 1700 series routers with Cisco IOS Release 12.4T software.

SmartInit

The following points must be observed while using SmartInit:

- If the user has configured the **no memory-size iomem** command from a pre-SmartInit image (old image) and a SmartInit image is loaded on the router, the router will boot with SmartInit enabled. The running configuration will not display any **memory-size iomem** command-line interface (CLI).
- If the user has configured the **memory-size iomem 10** command from a pre-SmartInit image and a SmartInit image is loaded on the router, the router will boot with SmartInit enabled. Consequently, the I/O memory size may not be 10 percent (as expected on a pre-SmartInit image).
- If the user configures the **memory-size iomem 10** command on a SmartInit image, it will be displayed in the running and startup configurations. This is different from the pre-SmartInit that does not display the **memory-size iomem 10** command because 10 percent is the default I/O memory size.
- If the user-configured I/O memory size is too low or too high, the I/O memory size calculated by the SmartInit image will be different from the configured value, but the running configuration will still display the configured value only. The user can get the actual iomem size using the **show version** or **show memory** command.

Using the boot flash Command

Booting a Cisco 1700 series router with the **boot flash** or **boot system flash** command results in unpredictable behavior. To work around this problem, be sure to enter a colon (:) following both commands (for example, **boot flash:** or **boot system flash:**).

Fan Operation in Cisco 1700 Series Routers

The fans in the Cisco 1700 series routers stay off until thermally activated (45°C/115°F).

Multipartition Flash Defaults

When you use a multipartition Flash card, the various flash partitions are referred to as "flash:1:", "flash:2:", and so on. If you specify only "flash" in a multipartition flash, the parser assumes "flash:1:". For example, if you enter the **show flash all** command, the parser defaults to "show flash:1: all" and only the flash information for the first partition displays. To display information for all flash partitions, enter the **show flash ?** command, which will list all of the valid partitions. Then enter the **show flash:xx: all** command on each valid partition.

Cisco 1800 Series Routers (Fixed Configuration and Modular)

This section contains the following sections with information that is specific to the Cisco 1800 series routers:

- Memory Recommendations, page 34
- Supported Hardware, page 34
- Feature Support, page 37
- Additional Notes for the Cisco 1800 Series, page 37

Memory Recommendations

For memory recommendations for the Cisco 1800 series routers in Cisco IOS Release 12.4T, see the "Memory Recommendations" section on page 8.

Supported Hardware

Cisco IOS Release 12.4T supports the following Cisco 1800 series routers:

- Cisco 1801, Cisco 1802, and Cisco 1803, wireless and non-wireless
- Cisco 1811 and Cisco 1812, wireless (fixed configuration)
- Cisco 1811 and Cisco 1812, without wireless (fixed configuration)
- Cisco 1841 (modular)
- Cisco 1861 (integrated services)

For detailed descriptions of the new hardware features, see the "New and Changed Information" section on page 101.

For additional information about supported hardware for this platform and release, see the Cisco Software Advisor at the following location:

http://tools.cisco.com/Support/Fusion/FusionHome.do

Cisco 1801 Routers

The Cisco 1801 router has the following hardware components:

- One Fast Ethernet port
- One ADSL over POTS port
- One ISDN-BRI S/T port
- Eight Fast Ethernet Switch ports

Cisco 1801W Routers

The Cisco 1801W router has the following hardware components:

- One Fast Ethernet port
- One ADSL over POTS port
- One ISDN-BRI S/T port
- Eight Fast Ethernet Switch ports

- IEEE 802.11a and 802.11b/g wireless

Cisco 1802 Routers

The Cisco 1802 router has the following hardware components:

- One Fast Ethernet port
- One ADSL over ISDN port
- One ISDN-BRI S/T port
- Eight Fast Ethernet Switch ports

Cisco 1802W Routers

The Cisco 1802W router has the following hardware components:

- One Fast Ethernet port
- One ADSL over ISDN port
- One ISDN-BRI S/T port
- Eight Fast Ethernet Switch ports
- IEEE 802.11a and 802.11b/g wireless

Cisco 1803 Routers

The Cisco 1803 router has the following hardware components:

- One Fast Ethernet port
- One G.SHDSL port
- One ISDN-BRI S/T port
- Eight Fast Ethernet Switch ports

Cisco 1803W Routers

The Cisco 1803W router has the following hardware components:

- One Fast Ethernet port
- One G.SHDSL port
- One ISDN-BRI S/T port
- Eight Fast Ethernet Switch ports
- IEEE 802.11a and 802.11b/g wireless

Cisco 1811 Routers

The Cisco 1811 router has the following hardware components:

- Two Fast Ethernet ports
- One V.92 modem port
- Eight Fast Ethernet switch ports
- Two Universal Serial Bus (USB) connectors

Cisco 1812 Routers

The Cisco 1812 router has the following hardware components:

- Two Fast Ethernet ports
- One ISDN-BRI S/T port
- Eight Fast Ethernet switch ports
- Two USB connectors

Cisco 1841 router

The Cisco 1841 router supports any combination of one or two of the following WAN interface cards (WICs) or multiflex Voice/WAN interface cards (VWICs) (data only), which are shared with the Cisco 1700, Cisco 2600, and Cisco 3600 series routers:

- WIC-1T: one-port high-speed serial (synchronous/asynchronous).
- WIC-2T: two-port high-speed serial (synchronous/asynchronous).
- WIC-2A/S: two-port low-speed serial (synchronous/asynchronous) (up to 128 kbps).
- WIC-1ADSL: one-port ADSL.
- WIC-1ADSL-I-DG: one-port ADSLoISDN WIC
- WIC-1ADSL-DG: one-port ADSLoPOTS WIC with dying gasp
- WIC-1B-S/T-V3: one-port ISDN WAN interface card (dial and leased line)
- WIC-1B-U-V2: one-port ISDN BRI NT-1 WIC for the Cisco 1700, 1800, 2600, 3600, and 3700 series
- WIC-1DSU-56K4: one-port integrated 56/64-kbps 4-wire DSU/CSU
- WIC-1DSU-T1-V2: updated one-port T1/fractional T1 DSU/CSU WIC
- WIC-1SHDSL: one-port G.SHDSL
- WIC-1SHDSL-V2
- WIC-1AM: one-port analog modem
- WIC-2AM: two-port analog modem
- HWIC-4A/S: four low-speed sync/async serial ports
- HWIC-4ESW: four-port 10/100 Ethernet switch interface card
- HWIC-8A/S-RS232: eight low-speed sync/async serial ports, EIA-232 only
- HWIC-8A: eight async EIA-232 serial ports
- HWIC-AP-G
- HWIC-AP-AG

The following T1/E1 multiflex VWICs are also supported on the Cisco 1841 for data applications only:

- VWIC-1MFT-E1: one-port RJ-48 multiflex trunk (E1)
- VWIC-2MFT-E1: two-port RJ-48 multiflex trunk (E1)
- VWIC-1MFT-G703: one-port RJ-48 multiflex trunk (G.703)
- VWIC-2MFT-G703: two-port RJ-48 multiflex trunk (G.703)
- VWIC-1MFT-T1: one-port RJ-48 multiflex trunk (T1)

- VWIC-2MFT-T1: two-port RJ-48 multiflex trunk (T1)
- VWIC-2MFT-E1-DI: two-port RJ-48 multiflex trunk (E1) (with drop and insert)
- VWIC-2MFT-T1-DI: two-port RJ-48 multiflex trunk (T1) (with drop and insert)
- VWIC2-1MFT-T1/E1
- VWIC2-2MFT-T1/E1
- VWIC2-1MFT-G703
- VWIC2-2MFT-G703

AIM-VPN/BPII-PLUS: DES/3DES/AES VPN Encryption/Compression card is also supported on the Cisco 1841.

AIM-VPN/SSL-1 Encryption Module is supported on the Cisco 1841.

USB flash:

- MEMUSB-64FT
- MEMUSB-128FT
- MEMUSB-256FT

Cisco 1861 Routers

The Cisco 1861 router has the following software components:

- Cisco Unified Communications Manager Express (Cisco Unified CME)
- Cisco Unity Express
- Security
- Cisco IOS Firewall
- Cisco Secure VPN

Feature Support

For feature support in Cisco IOS Release 12.4, see the "Feature Support" section on page 7.

Additional Notes for the Cisco 1800 Series

This section contains important information about using the Cisco 1800 series routers with Cisco IOS Release 12.4T software.

ADSL2 and ADSL2+ Support

Cisco IOS Release 12.4(4)T introduces ADSL2 and ADSL2+ features for the Cisco 1801 and Cisco 1802 routers. For "dsl operating-mode" configuration, see the following:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124newft/124t/124t4/dsl_hwic.htm

BGP in IP Base

BGP is available in the "IP base" software package in Cisco IOS Release 12.4(11)T for Cisco 1841, Cisco 2800 family, and Cisco 3800 family routers.

Cisco 1805 Cable Router

This section contains the following sections with information that is specific to the Cisco 1805 cable router:

- Introduction, page 38
- Memory Recommendations, page 38
- Supported Hardware, page 38
- Feature Support, page 38

Introduction

Cisco 1805 DOCSIS cable routers are fixed-configuration routers with LAN and WAN connections. The Cisco 1805 cable router supports three SKUs:

- CISCO1805-D
- CISCO1805-E
- CISCO1805-D/K9

The Cisco 1805 DOCSIS cable router is a data-only device for desktop use.

Memory Recommendations

For memory recommendations for the Cisco 1805 cable router in Cisco IOS Release 12.4T, see the "Memory Recommendations" section on page 8.

Supported Hardware

Cisco IOS Release 12.4T supports the Cisco 1805 cable router.

For detailed descriptions of the new hardware features, see the "New and Changed Information" section on page 101.

For additional information about supported hardware for this platform and release, see the Cisco Software Advisor at the following location:

http://tools.cisco.com/Support/Fusion/FusionHome.do

Feature Support

For feature support in Cisco IOS Release 12.4, see the "Feature Support" section on page 7.

Cisco IAD2430 Series

This section contains the following sections with information that is specific to the Cisco IAD2430 series routers:

- Introduction, page 39
- Memory Recommendations, page 39
- Supported Hardware, page 39
- Feature Support, page 41

Introduction

The Cisco IAD2430 is the next generation integrated voice and data services platform for Service Providers, building on the Cisco IAD2420 series IAD. The Cisco IAD2430 series offers software functionality such as MGCP SRST used to accelerate the migration from TDM to VoIP cost efficiently. The Cisco IAD2430 series harnesses the maturity of the Cisco IAD2420 series software and enhances functionality by providing more capabilities such as denser interfaces (up to 24 FXS or up to 2 voice and 2 data T1s), encryption, and DC power backup while maintaining its 1RU form factor for space saving service provider managed services deployment.

Memory Recommendations

For memory recommendations for the Cisco IAD2430 series integrated access devices in Cisco IOS Release 12.4T, see the "Memory Recommendations" section on page 8.

Supported Hardware

Cisco IOS Release 12.4T supports the following Cisco IAD2430 series integrated access devices:

- Cisco 2430-24FXS IAD
- Cisco 2431-8FXS IAD
- Cisco 2431-16FXS IAD
- Cisco 2431-1T1E1 IAD
- Cisco 2432-24FXS IAD
- Cisco 2435-8FXS IAD (introduced in Cisco IOS Release 12.4(22)T. The Cisco 2435-8FXS IAD is a fixed configuration platform and does not support any interface cards.)

For detailed descriptions of the new hardware features, see the "New and Changed Information" section on page 101.

Each Cisco IAD2430 series router is preconfigured for one WAN port. The WAN port can be an FE or T1/E1 port. When the platform has two T1/E1 ports, one can be used as a DSU port and the other can be used as a digital voice port for connection to a PBX.

Table 1 lists the supported interfaces for the Cisco IAD2430 series.

Table 1 Supported Interfaces on the Cisco IAD2430 Series Integrated Access Devices

Interface and Port	Product Description	Supported IAD2430 Models
10/100BASE-T Fast Ethernet port	All Cisco IAD2430 series models have two 10/100BASE-T Fast Ethernet ports except for Cisco2431-8FXS IAD, which has one.	All
Console and auxiliary ports	One EIA/TIA-32 asynchronous serial port for connection to a console. One EIA/TIA-32 asynchronous serial port for connection to a modem.	All
Console and auxiliary ports	Dual purpose single EIA/TIA-32 asynchronous serial port for connection to a console or modem.	IAD2435-8FXS
Analog FXS voice ports over RJ-21 connector	One 8-line or 16-line analog or 24-line FXS interface (loop-start or ground-start) for connection to analog phones, key systems, or PBXs.	• IAD2430-24FXS: 24 ports • IAD2431-8FXS: 8 ports • IAD2431-16FXS: 16 ports • IAD2432-24FXS: 24 ports • IAD2435-8FXS
VIC2-4FX0	All models support one VIC slot, except for Cisco IAD2430-24FXS IAD, which supports none.	• IAD2431-8FXS • IAD2431-16FXS • IAD2431-1T1E1 • IAD2432-24FXS
T1/E1 Port	Two or one T1 ports for WAN connection or with channel-associated signaling (CAS) for connection to a digital PBX, except for Cisco IAD2430-24FXS IAD, which supports none. E1 ports are not supported.	• IAD2431-8FXS: 1 port • IAD2431-16FXS: 1 port • IAD2431-1T1E1: 2 ports • IAD2432-24FXS: 2 ports
WIC-2T	All models support one WIC slot, except for Cisco IAD2430-24FXS IAD, which supports none. The supported WICs are WIC-2T and WIC-1DSU-T1. One 2T port (balanced, per ANSI T1.403) for connection to a WAN or carrier network or for a serial connection	• IAD2431-8FXS • IAD2431-16FXS • IAD2431-1T1E1 • IAD2432-24FXS
WIC-1DSU-T1	One DSU port for connection to a WAN or carrier network.	• IAD2431-8FXS • IAD2431-16FXS • IAD2431-1T1E1 • IAD2432-24FXS
External compact flash card	An external compact flash card is supported on all models.	All

The supported WICs and VICs are:

- VIC2-2FXO

- VIC2-2FXS
- VIC-4FXS/DID
- VIC2-2BRI-NT/TE
- WIC-1T
- WIC-1ADSL
- WIC-1SHDSL
- WIC-1ADSL-DG
- WIC-1SHDSL-V2
- VWIC-2MFT-T1
- VWIC-2MFT-E1

Feature Support

For feature support in Cisco IOS Release 12.4T, see the "Feature Support" section on page 7.

Cisco 2600XM Series and Cisco 2691 Modular Access Routers

This section contains the following sections with information that is specific to the Cisco 2600XM series and Cisco 2691 modular access routers:

- Introduction, page 42
- Memory Recommendations, page 42
- Supported Hardware, page 42
- Other Firmware Code, page 49
- Feature Support, page 49

Introduction

With the Cisco 2600 series modular access router family, Cisco extends enterprise-class and managed services CPE versatility, integration, and power to branch offices. The widely deployed Cisco 2600 series modular access routers are designed to enable customers to easily adopt future technologies and scale to accommodate network expansion. The Cisco 2600 series shares modular interfaces with the Cisco 1600, Cisco 1700, and Cisco 3600 series, providing a solution to meet the branch office needs for applications such as the following:

- Internet/intranet access with firewall security
- Multiservice voice/data integration
- Analog and digital dial access services
- Virtual Private Network (VPN) access
- Inter-VLAN routing
- Routing with bandwidth management

The Cisco 2600 series modular architecture provides the versatility needed to adapt to changes in network technology as new services and applications become available. Driven by a powerful RISC processor, the Cisco 2600 series supports the advanced quality of service (QoS), security, and network integration features required in evolving enterprise networks.

Memory Recommendations

For memory recommendations for the Cisco 2600 series modular access routers in Cisco IOS Release 12.4T, see the "Memory Recommendations" section on page 8.

Supported Hardware

Cisco IOS Release 12.4T supports the following Cisco 2600 series routers:

- Cisco 2610XM and Cisco 2611XM
- Cisco 2620XM and Cisco 2621XM
- Cisco 2650XM and Cisco 2651XM
- Cisco 2691

For detailed descriptions of the new hardware features, see the "New and Changed Information" section on page 101.

Table 2 lists the supported interfaces for the Cisco 2600 series routers for Cisco IOS Release 12.4T.

Table 2 Supported Interfaces for the Cisco 2600 Series Routers

Interface, Network Module, or Data Rate[1]	Product Description	Supported Platforms
LAN interfaces	1- or 2-port 10/100-Mbps Fast Ethernet	Cisco 2610XM, Cisco 2611XM, Cisco 2620XM, Cisco 2621XM, Cisco 2650XM, Cisco 2651XM, Cisco 2691
LAN network modules	1-port Ethernet	All Cisco 2600 series platforms
	4-port Ethernet	All Cisco 2600 series platforms
Fast Ethernet network module	1-port Fast Ethernet network module (10/100BASE fiber only) (NM-1FE-FX-V2)	Cisco 2691 platform only
	16-port Ethernet Switch Module for the Cisco 2600 or Cisco 3600 series (NM-16ESW)	All Cisco 2600 and Cisco 3600 series platforms
Serial network modules	16- or 32-port asynchronous serial low speed (134 kbps max)	All Cisco 2600 series platforms
	32-port high-density asynchronous network module	Cisco 2610XM, Cisco 2611XM, Cisco 2620XM, Cisco 2621XM, Cisco 2650XM, Cisco 2651XM Cisco 2691
	4- or 8-port asynchronous/synchronous serial low-speed (128 kbps max)	All Cisco 2600 series platforms
	16-port asynchronous/synchronous serial low-speed (128 kbps max)	Cisco 2610XM, Cisco 2611XM, Cisco 2620XM, Cisco 2621XM, Cisco 2650XM, Cisco 2651XM Cisco 2691
	4-port serial (NM-4T)	Cisco 2691
	1-port T3/E3 (NM-1T3/E3)	Cisco 2691
ATM network modules[1]	4-port T1 ATM network module with IMA (NM-4T1-IMA)	All Cisco 2600 series platforms
	4-port E1 ATM network module with IMA (NM-4E1-IMA)	All Cisco 2600 series platforms
	8-port T1 ATM network module with IMA (NM-8T1-IMA)	All Cisco 2600 series platforms
	8-port E1 ATM network module with IMA (NM-8E1-IMA)	All Cisco 2600 series platforms
	1-port ATM T3 network module (NM-1A-T3)	All Cisco 2600 series platforms
	1-port ATM E3 network module (NM-1A-E3)	All Cisco 2600 series platforms
	1-port ATM-25 RJ-45 interface	All Cisco 2600 series platforms
	Single-port ATM OC-3 single-mode and multimode intermediate-reach network module	Cisco 2691

Table 2 Supported Interfaces for the Cisco 2600 Series Routers (Continued)

Interface, Network Module, or Data Rate[1]	Product Description	Supported Platforms
Digital T1 Packet Voice Trunk Network Modules and Spare Components	1-port 24-channel T1 voice/fax module supports 24 channels of medium-complexity codecs (G.729a/b, G.726, G.711, and fax) or 12 channels of G.726, G.729, G.723.1, G.728, G.729a/b, G.711, and fax. Consists of one NM-HDV, two PVDM-12s, and one VWIC-1MFT-T1.[2] Part number: NM-HDV-1T1-24.	All Cisco 2600 series platforms
	1-port enhanced 24-channel T1 voice/fax module supports 24 channels of high- and medium-complexity codecs (G.729a/b, G.726, G.729, G.728, G.723.1, G.711, and fax). Consists of one NM-HDV, four PVDM-12s, and one VWIC-1MFT-T1.[2] Part number: NM-HDV-1T1-24E.	All Cisco 2600 series platforms
	2-port 48-channel T1 voice/fax module supports add/drop multiplexing (drop and insert); 48 channels of medium-complexity codecs (G.729a/b, G.726, G.711, and fax) or 24 channels of G.726, G.729, G.723.1, G.728, G.729a/b, G.711, and fax. Consists of one NM-HDV, four PVDM-12s, and one VWIC-2MFT-T1-DI.[2] Part number: NM-HDV-2T1-48.	All Cisco 2600 series platforms
	High-density voice/fax network module spare (NM-HDV)	Digital T1/E1 packet voice trunk network modules spare component
	12-channel packet voice DSP module upgrade spare (PVDM-12)	Digital T1/E1 packet voice trunk network modules spare component
	1-port RJ-48 multiflex trunk—T1 (VWIC-1MFT-T1)[2]	Digital T1/E1 packet voice trunk network modules spare component
	2-port RJ-48 multiflex trunk—T1 (VWIC-2MFT-T1)[2]	Digital T1/E1 packet voice trunk network modules spare component
	2-port RJ-48 multiflex trunk with drop and insert—T1 (VWIC-2MFT-T1-DI)[2]	Digital T1/E1 packet voice trunk network modules spare component
Digital E1 Packet Voice Network Modules	1-port 30-channel E1 high-density voice network module (NM-HDV-1E1-30)	All Cisco 2600 series platforms
	1-port enhanced 30-channel E1 high-density voice network module (NM-HDV-1E130E)	All Cisco 2600 series platforms
	2-port 60-channel high-density voice network module (NM-HDV-2E1-60)	All Cisco 2600 series platforms
	1-port 12-channel E1 voice and fax	All Cisco 2600 series platforms

Table 2 Supported Interfaces for the Cisco 2600 Series Routers (Continued)

Interface, Network Module, or Data Rate[1]	Product Description	Supported Platforms
Dial, ISDN, and Channelized Serial Network Modules	1-port High Speed Serial Interface (HSSI) network module	Cisco 2691
	1- or 2-port channelized T1/ISDN PRI (NM-1CT1, NM-2CT1)	All Cisco 2600 series platforms
	1- or 2-port channelized T1/ISDN PRI with CSU (NM-1CT1-CSU, NM-2CT1-CSU)	All Cisco 2600 series platforms
	1- or 2-port channelized E1/ISDN PRI balanced (NM1CE1B, NM-2CE1B)	All Cisco 2600 series platforms
	1- or 2-port channelized E1/ISDN PRI unbalanced (NM1CE1U, NM-2CE1U)	All Cisco 2600 series platforms
	1- or 2-port channelized E1/T1/ISDN-PRI network modules (NM-1CE1T1-PRI and NM-2CE1T1-PRI)	Cisco 2610XM, Cisco 2611XM, Cisco 2620XM, Cisco 2621XM, Cisco 2650XM, Cisco 2651XM Cisco 2691
	4- or 8-port ISDN BRI S/T interface (NM-4B-S/T, NM-8B-S/T)	All Cisco 2600 series platforms
	4- or 8-port ISDN BRI U (NT-1) interface (NM-4B-U, NM-8B-U)	All Cisco 2600 series platforms
	8- or 16-port analog modems (NM-8AM, NM-8AM-V2, NM-16AM, NM-16AM-V2)	All Cisco 2600 series platforms
EtherSwitch Service Modules	One 16-port 10/100 Cisco EtherSwitch service module with 802.3af, 1 10/100/1000 port, and IP base (NME-16ES-1G-P)	Cisco 2691

Table 2 Supported Interfaces for the Cisco 2600 Series Routers (Continued)

Interface, Network Module, or Data Rate[1]	Product Description	Supported Platforms
T1/E1 Multiflex Voice/WAN Interface Cards[3]	1-port T1 multiflex trunk interface (VWIC-1MFT-T1)	All Cisco 2600 series platforms
	1-port E1 multiflex trunk interface (VWIC-1MFT-E1)	All Cisco 2600 series platforms
	2-port T1 multiflex trunk interface (VWIC-2MFT-T1)	All Cisco 2600 series platforms
	2-port E1 multiflex trunk interface (VWIC-2MFT-E1)	All Cisco 2600 series platforms
	2-port T1 multiflex trunk interface with drop and insert (VWIC-2MFT-T1-DI)	All Cisco 2600 series platforms
	2-port E1 multiflex trunk interface with drop and insert (VWIC-2MFT-E1-DI)	All Cisco 2600 series platforms
	1-port T1/E1 multiflex trunk VWIC (VWIC2-1MFT-T1/E1)	Cisco 2610XM, Cisco 2611XM, Cisco 2620XM, Cisco 2621XM, Cisco 2650XM, Cisco 2651XM, Cisco 2691
	2-port T1/E1 multiflex trunk VWIC (VWIC2-2MFT-T1/E1)	Cisco 2610XM, Cisco 2611XM, Cisco 2620XM, Cisco 2621XM, Cisco 2650XM, Cisco 2651XM, Cisco 2691
	1-port G.703 multiflex trunk VWIC (VWIC2-1MFT-G703)	Cisco 2610XM, Cisco 2611XM, Cisco 2620XM, Cisco 2621XM, Cisco 2650XM, Cisco 2651XM, Cisco 2691
	2-port G.703 multiflex trunk VWIC (VWIC2-2MFT-G703)	Cisco 2610XM, Cisco 2611XM, Cisco 2620XM, Cisco 2621XM, Cisco 2650XM, Cisco 2651XM, Cisco 2691
	32-channel multiflex trunk dedicated echo cancellation module (ECAN modules) (EC-MFT-32)	Cisco 2610XM, Cisco 2611XM, Cisco 2620XM, Cisco 2621XM, Cisco 2650XM, Cisco 2651XM, Cisco 2691
	64-channel multiflex trunk dedicated echo cancellation module (ECAN modules) (EC-MFT-64)	Cisco 2610XM, Cisco 2611XM, Cisco 2620XM, Cisco 2621XM, Cisco 2650XM, Cisco 2651XM, Cisco 2691
Other Network Modules	Contact closure network module (NM-AIC-64)	All Cisco 2600 and Cisco 3600 series platforms

Table 2 Supported Interfaces for the Cisco 2600 Series Routers (Continued)

Interface, Network Module, or Data Rate[1]	Product Description	Supported Platforms
Voice/Fax Interface Cards	1- or 2-port voice/fax network module (NM-1V, NM-2V, NM-HD-1V, NM-HD-2V, NM-HD-2VE)	All Cisco 2600 series platforms
	Cisco Unity Express voice mail network module (NM-CUE)	Cisco 2610XM, Cisco 2611XM, Cisco 2620XM, Cisco 2621XM, Cisco 2650XM, Cisco 2651XM Cisco 2691
	1-slot high-density T1/E1 VIC slots[4]	All Cisco 2600 series platforms
	2-port FXS voice/fax interface card (VIC-2FXS)[5]	All Cisco 2600 series platforms with NM-1V or NM-2V network modules
	2-port FXS voice/fax interface card (VIC2-2FXS)	All Cisco 2600 series platforms with NM-HD-1V, NM-HD-2V, or NM-HD-2VE network modules
	2-port E&M voice/fax interface card (VIC-2E/M)[5]	All Cisco 2600 series platforms with NM-1V or NM-2V network modules
	2-port E&M voice/fax interface card (VIC2-2E/M)	All Cisco 2600 series platforms with NM-HD-1V, NM-HD-2V, or NM-HD-2VE network module
	2-port FXO voice/fax interface card (VIC-2FXO, VIC-2FXO-M3, and VIC-2FXO-EU)[5]	All Cisco 2600 series platforms with NM-1V or NM-2V network modules
	2-port universal FXO voice/fax interface card (VIC-2FXO)	All Cisco 2600 series platforms with NM-HD-1V, NM-HD-2V, or NM-HD-2VE network module
	4-port FXS/DID voice/fax interface card (VIC2-4FXS/DID)	All Cisco 2600 series platforms with NM-HD-1V, NM-HD-2V, or NM-HD-2VE network module
	4-port universal FXO voice/fax interface card (VIC2-4FXO)	All Cisco 2600 series platforms with NM-HD-1V, NM-HD-2V, or NM-HD-2VE network module
WAN Interface Cards	1-port ADSL WIC (WIC-1ADSL)	All Cisco 2600 series platforms
	1-port ADSL over ISDN WIC (WIC-1ADSL-I-DG)	Cisco 2610XM, Cisco 2611XM, Cisco 2620XM, Cisco 2621XM, Cisco 2650XM, Cisco 2651XM Cisco 2691

Table 2 Supported Interfaces for the Cisco 2600 Series Routers (Continued)

Interface, Network Module, or Data Rate[1]	Product Description	Supported Platforms
	1-port ADSL over POTS with dying gasp (WIC-1ADSL-DG)	Cisco 2610XM, Cisco 2611XM, Cisco 2620XM, Cisco 2621XM, Cisco 2650XM, Cisco 2651XM Cisco 2691
	1-port G.SHDSL WIC (WIC-1SHDSL)	Cisco 2610XM, Cisco 2611XM, Cisco 2620XM, Cisco 2621XM, Cisco 2650XM, Cisco 2651XM Cisco 2691
	1-port G.SHDSL with 4-wire support WIC (WIC-1SHDSL-V2)	Cisco 2610XM, Cisco 2611XM, Cisco 2620XM, Cisco 2621XM, Cisco 2650XM, Cisco 2651XM Cisco 2691
	1-port ISDN BRI S/T interface (requires external NT-1) (WIC-1B-S/T, WIC-1B-S/T-V3)	All Cisco 2600 series platforms
	1-port ISDN BRI (NT-1) U (WIC-1B-U, WIC-1B-U-V2)	All Cisco 2600 series platforms
	1-port 56/64-kbps DSU/CSU	All Cisco 2600 series platforms
	1-port T1/fractional T1 with DSU/CSU WIC (WIC-1DSU-T1, WIC-1DSU-T1-V2)	All Cisco 2600 series platforms
	1-port high-speed serial (up to 2.048 Mbps) (WIC-1T)	All Cisco 2600 series platforms
	2-port dual high-speed serial (up to 8 Mbps; asynchronous/synchronous support) (WIC-2T)	All Cisco 2600 series platforms
	2-port asynchronous/synchronous (up to 128 kbps) (WIC-2A/S)	All Cisco 2600 series platforms
Advanced Integration Module	Data compression AIM (up to 8.192 Mbps) (AIM-COMPR2 and AIM-COMPR2-V2)	Cisco 2610XM, Cisco 2611XM, Cisco 2620XM, Cisco 2621XM, Cisco 2650XM, Cisco 2651XM
	Data compression AIM (up to 16.384 Mbps) (AIM-COMPR4)	Cisco 2691
	DES/3DES/AES VPN encryption and compression module (AIM-VPN/BPii-PLUS)	Cisco 2610XM, Cisco 2611XM, Cisco 2620XM, Cisco 2621XM, Cisco 2650XM, Cisco 2651XM
	Enhanced Performance Hardware encryption AIM (AIM-VPN/EP, AIM-VPN/EPII, AIM-VPN/EPII-PLUS)	Cisco 2691
	Hardware encryption AIM (AIM-VPN/BP, AIM-VPN/BPII, AIM-VPN/BPII-PLUS)	Cisco 2610XM, Cisco 2611XM, Cisco 2620XM, Cisco 2621XM, Cisco 2650XM, Cisco 2651XM
Content Engine Network Modules	NM-CE-BP-40G-K9, Content Engine NM-Basic Perf-40GB	All Cisco 2600 series platforms
	NM-CE-BP-80G-K9, Content Engine NM-Basic Perf-80GB	All Cisco 2600 series platforms
	NM-CE-BP-SCSI-K9, Content Engine NM-Basic Perf-SCSI	All Cisco 2600 series platforms

1. The voice/fax and ATM network modules require Cisco IOS Plus feature sets.
2. See T1/E1 multiflex voice/WAN interface cards in this table.
3. T1 and E1 multiflex voice/WAN interface cards can be used in a chassis slot or installed in a high-density voice network module.

4. Uses the VWIC-MFT T1/E1 interface cards.
5. Requires the NM-1V or NM-2V network module.

Other Firmware Code

The latest version of analog modem firmware for the Cisco 2600 series supports the internal analog modems (both NM-16AM and NM-8AM) in a wide range of countries, starting with Cisco IOS Release 11.3(5)T. The latest firmware (version 1.2.0) also supports dial-out and fax-out.

Additional information can be found on Cisco.com, beginning under the Service & Support heading:

Technical Documents: Documentation Home Page: Access Servers and Access Routers: Modular Access Routers: Cisco 2600 Series Routers: Analog Modem Firmware

Feature Support

For feature support in Cisco IOS Release 12.4T, see the "Feature Support" section on page 7.

Cisco 2800 Series Routers

This section contains the following sections with information that is specific to the Cisco 2800 series routers:

- Introduction, page 50
- Memory Recommendations, page 50
- Supported Hardware, page 50
- Feature Support, page 57
- Additional Notes for the Cisco 2800 Series Routers, page 57

Introduction

Cisco IOS Release 12.4T supports the Cisco 2800 series integrated services routers.

The Cisco 2800 series integrated services routers comprise the Cisco 2801, Cisco 2811, Cisco 2821, and Cisco 2851 routers. These routers differ as follows:

- Cisco 2801 routers support two HWIC/WIC/VIC/VWIC slots capable of supporting double-wide HWICs, one WIC/VWIC/VIC slot, one VWIC/VIC (voice only) slot, two Advanced Integration Modules (AIM), two packet voice data modules (PVDMs), two Fast Ethernet connections, and 16 ports of IP phone power output.
- Cisco 2811 routers support one single network module enhanced (NME), four single or two double high-speed WAN interface cards (HWICs), two AIMs, two PVDMs, two Fast Ethernet connections, and 24 ports of IP phone power output.
- In Cisco 2821 routers, the network module slot adds support for a single network module enhanced extended (NME-X), and an additional slot supports an extension voice module (EVM); three PVDMs are supported; the LAN ports support two Gigabit Ethernet ports; and 36 ports of IP phone power output are available.
- In Cisco 2851 routers, the network module slot adds support for network module double-wide (NMD) and network module enhanced extended double-wide (NME-XD), and the IP phone power output is increased to 48 ports.

A high density extension module (HDEM) operates in the EVM slot on the Cisco 2821 and Cisco 2851 routers. The EVM slot supports additional voice services and density without consuming the network module slot on those routers.

Memory Recommendations

For memory recommendations for the Cisco 2800 series routers in Cisco IOS Release 12.4T, see the "Memory Recommendations" section on page 8.

Note The minimum DRAM to run c2801-adventerprisek9-mz in Cisco IOS Release 12.4T is 192 MB.

Supported Hardware

Cisco IOS Release 12.4 supports the following Cisco 2800 series routers:

- Cisco 2801

- Cisco 2811
- Cisco 2821
- Cisco 2851

For detailed descriptions of the new hardware features, see the "New and Changed Information" section on page 101.

For additional information about supported hardware for this platform and release, see the Cisco Software Advisor at the following location:

http://tools.cisco.com/Support/Fusion/FusionHome.do

Table 3 lists the supported interfaces for the Cisco 2800 series routers for Cisco IOS Release 12.4 T.

Table 3 Supported Modules and Interface Cards for the Cisco 2800 Series Routers

Network Module	Product Description	Supported Platforms
Ethernet Switching Network Modules		
NM-16ESW	16-port 10/100 Cisco EtherSwitch network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-16ESW-1GIG	16-port 10/100 Cisco EtherSwitch network module with 1 Gigabit Ethernet (1000BASE-T) port	Cisco 2811, Cisco 2821, Cisco 2851
NM-16ESW-PWR	16-port 10/100 Cisco EtherSwitch network module with in-line power support	Cisco 2811, Cisco 2821, Cisco 2851
NM-16ESW-PWR-1GIG	16-port 10/100 Cisco EtherSwitch network module with in-line power and Gigabit Ethernet	Cisco 2811, Cisco 2821, Cisco 2851
NMD-36ESW	36-port 10/100 Cisco EtherSwitch high-density services module (HDSM)	Cisco 2851
NMD-36ESW-2GIG	36-port 10/100 Cisco EtherSwitch HDSM with 1 Gigabit Ethernet (1000BASE-T) port	Cisco 2851
NMD-36ESW-PWR	36-port 10/100 Cisco EtherSwitch HDSM with in-line power support	Cisco 2851
NMD-36ESW-PWR-2G	36-port 10/100 Cisco EtherSwitch HDSM with in-line power and Gigabit Ethernet	Cisco 2851
NME-16ES-1G-P	One 16-port 10/100 Cisco EtherSwitch service module with 802.3af, 1 10/100/1000 port, and IP base	Cisco 2811, Cisco 2821, Cisco 2851
NME-X-23ES-1G-P	One 23-port 10/100 Cisco EtherSwitch service module with 802.3af, 1 10/100/1000 port w/ 802.3af, and IP base	Cisco 2821, Cisco 2851
NME-XD-24ES-1S-P	One 24-port 10/100 Cisco EtherSwitch service module with 802.3af, 1 SFP, Cisco StackWise connectors, and IP base	Cisco 2851
NME-XD-48ES-2S-P	One 48-port 10/100 Cisco EtherSwitch service module with 802.3af, 2 SFPs, and IP base	Cisco 2851
Serial Connectivity Network Modules		
NM-1T3/E3	1-port clear-channel T3/E3 network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-1HSSI	1-port HSSI network module	Cisco 2811, Cisco 2821, Cisco 2851

Table 3 Supported Modules and Interface Cards for the Cisco 2800 Series Routers (Continued)

Network Module	Product Description	Supported Platforms
NM-4A/S	4-port asynchronous/synchronous serial network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-8A/S	8-port asynchronous/synchronous serial network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-16A/S	16-port asynchronous/synchronous serial network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-16A	16-port asynchronous serial network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-32A	32-port asynchronous serial network module	Cisco 2811, Cisco 2821, Cisco 2851
Channelized T1/E1 and ISDN Network Modules		
NM-1CE1T1-PRI	1-port Channelized E1/T1/ISDN PRI network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-2CE1T1-PRI	2-port Channelized E1/T1/ISDN PRI network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-4B-S/T	4-port ISDN BRI network module (S/T interface)	Cisco 2811, Cisco 2821, Cisco 2851
NM-4B-U	4-port ISDN BRI network module with integrated Network Termination 1 (NT1) (U interface)	Cisco 2811, Cisco 2821, Cisco 2851
NM-8B-S/T	8-port ISDN BRI network module (S/T interface)	Cisco 2811, Cisco 2821, Cisco 2851
NM-8B-U	8-port ISDN BRI network module with integrated NT1 (U interface)	Cisco 2811, Cisco 2821, Cisco 2851
ATM Network Modules		
NM-1A-T3	1-port DS-3 ATM network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-1A-E3	1-port E# ATM network module	Cisco 2811, Cisco 2821, Cisco 2851
Analog Dialup and Remote Access Network Modules		
NM-8AM-V2	8-port analog modem network module with v.92	Cisco 2811, Cisco 2821, Cisco 2851
NM-16AM-V2	16-port analog modem network module with v.92	Cisco 2811, Cisco 2821, Cisco 2851
Voice Network Modules and Accessories		
NM-HD-1V	1-slot IP communications voice and fax network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-HD-2V	2-slot IP communications enhanced voice and fax network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-HD-2VE	2-slot IP communications enhanced voice and fax network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-HDA-4FXS	High-density analog voice and fax network module with 4 FXS slots	Cisco 2811, Cisco 2821, Cisco 2851

Table 3 Supported Modules and Interface Cards for the Cisco 2800 Series Routers (Continued)

Network Module	Product Description	Supported Platforms
NM-HDV2	IP communications high-density voice and fax network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-HDV2-1T1/E1	1-port T1/E1 IP communications high-density voice and fax network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-HDV2-2T1/E1	2-port T1/E1 IP communications high-density voice and fax network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-HDV=	High-density voice/fax network module (single VIC slot)	Cisco 2811, Cisco 2821, Cisco 2851
NM-HDV-1T1-12	1-port 12-channel T1 voice and fax network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-HDV-1T1-24	1-port 24-channel T1 voice and fax network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-HDV-1T1-24E	Single-port 24-enhanced-channel T1 voice and fax network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-HDV-2T1-48	2-port 48-channel T1 voice and fax network module	
NM-HDV-1E1-12	1-port 12-channel E1 voice and fax network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-HDV-1E1-30	1-port 30-channel E1 voice and fax network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-HDV-1E1-30E	1-port 30-enhanced-channel E1 voice and fax network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-HDV-2E1-60	2-port 60-channel E1 voice and fax network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-HDV-1J1-30	1-port 30-channel J1 high-density voice network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-HDV-1J1-30E	1-port 30-enhanced-channel J1 high-density voice network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-HDV-FARM-C36	36-port transcoding and conferencing DSP farm	Cisco 2811, Cisco 2821, Cisco 2851
NM-HDV-FARM-C54	54-port transcoding and conferencing DSP farm	Cisco 2811, Cisco 2821, Cisco 2851
NM-HDV-FARM-C90	90-port transcoding and conferencing DSP farm	Cisco 2811, Cisco 2821, Cisco 2851
Application Network Modules		
NM-CE-BP-40G-K9	Cisco content engine network module basic performance, 40-GB IDE hard disk	Cisco 2811, Cisco 2821, Cisco 2851
NM-CE-BP-80G-K9	Cisco content engine network module basic performance, 80-GB IDE hard disk	Cisco 2811, Cisco 2821, Cisco 2851
NM-CE-BP-SCSI-K9	Cisco content engine network module basic performance, Small Computer System Interface (SCSI) controller	Cisco 2811, Cisco 2821, Cisco 2851
NM-CIDS-K9	Cisco IDS network module	Cisco 2811, Cisco 2821, Cisco 2851

Table 3 Supported Modules and Interface Cards for the Cisco 2800 Series Routers (Continued)

Network Module	Product Description	Supported Platforms
NM-CUE	Cisco Unity Express voice-mail network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-NAM	Cisco 2600, 3660, 3700 series network analysis module	Cisco 2811, Cisco 2821, Cisco 2851
Alarm Monitoring and Control Network Modules and Accessories		
NM-AIC-64	Alarm monitoring and control network module	Cisco 2811, Cisco 2821, Cisco 2851
Circuit Emulation over IP (CEoIP) Network Modules		
NM-CEM-4SER	4-port serial CEoIP network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-CEM-T4E1	4-port T1/E1 CEoIP network module	Cisco 2811, Cisco 2821, Cisco 2851
Extension Voice Module		
EVM-HD-8FXS/DID	High-density voice/fax extension module-8FXS/DID	Cisco 2821 and Cisco 2851
Interface-Card Support	**Product Description**	**Supported Platforms**
Access Point HWIC		
HWIC-AP-AG		All Cisco 2800 series platforms
HWIC-AP-G		All Cisco 2800 series platforms
Ethernet Switching HWICs		
HWIC-4ESW	4-port single-wide 10/100BASET Ethernet switch HWIC	All Cisco 2800 series platforms
HWIC-D-9ESW	9-port double-wide 10/100BASET Ethernet switch HWIC	All Cisco 2800 series platforms
HWIC-4ESW-POE	4-port Ethernet switch HWIC, power over Ethernet capable	All Cisco 2800 series platforms
HWIC-D-9-ESW-POE	9-port Ethernet switch HWIC, power over Ethernet capable	All Cisco 2800 series platforms
Gigabit Ethernet HWICs		
HWIC-1GE-SFP		Cisco 2811, Cisco 2821, Cisco 2851
Serial WICs and HWICs		
WIC-1T	1-port high-speed serial WIC	All Cisco 2800 series platforms
WIC-2T	2-port high-speed serial WIC	All Cisco 2800 series platforms
WIC-2A/S	2-port asynchronous/synchronous serial WIC	All Cisco 2800 series platforms
HWIC-4T	4 high-speed serial ports	All Cisco 2800 series platforms
HWIC-4A/S	4 low-speed synchronous/asynchronous serial ports	All Cisco 2800 series platforms
HWIC-8A/S-232	8 low-speed synchronous/async serial ports, EIA-232 only	All Cisco 2800 series platforms
HWIC-8A	8 async EIA-232 serial ports	All Cisco 2800 series platforms
HWIC-16A	16 async EIA-232 serial ports	All Cisco 2800 series platforms
CSU/DSU WICs		
WIC-1DSU-T1-V2	1-port T1/Fractional-T1 DSU/CSU WIC	All Cisco 2800 series platforms
WIC-1DSU-56K4	1-port 4-wire 56-/64-kbps DSU/CSU WIC	All Cisco 2800 series platforms

Table 3 Supported Modules and Interface Cards for the Cisco 2800 Series Routers (Continued)

Network Module	Product Description	Supported Platforms
ISDN BRI WICs		
WIC-1B-U-V2	1-port ISDN BRI with integrated NT1 (U interface)	All Cisco 2800 series platforms
WIC-1B-S/T-V3	1-port ISDN BRI with S/T interface	All Cisco 2800 series platforms
DSL WAN Interface Cards		
WIC-1ADSL	1-port asymmetric DSL (ADSL) over POTS service WIC	All Cisco 2800 series platforms
WIC-1ADSL-DG	1-port ADSL over basic telephone service with dying gasp WIC	All Cisco 2800 series platforms
WIC-1ADSL-1-DG	1-port ADSL over ISDN with dying gasp WIC	All Cisco 2800 series platforms
WIC-1SHDSL	1-port G.SHDSL WIC (2-wire only)	All Cisco 2800 series platforms
WIC-1SHDSL-V2	1-port G.SHDSL WIC (2- or 4-wire)	All Cisco 2800 series platforms
Analog Modem WICs		
WIC-1AM	1-port analog modem WIC	All Cisco 2800 series platforms
WIC-2AM	2-port analog modem WIC	All Cisco 2800 series platforms
WIC-1AM-V2	1-port analog modem WIC	All Cisco 2800 series platforms
WIC-2AM-V2	2-port analog modem WIC	All Cisco 2800 series platforms
T1, E1, and G.703 Multiflex Trunk Voice Cards and WICs		
VWIC-1MFT-T1	1-port RJ-48 multiflex trunk-T1	All Cisco 2800 series platforms
VWIC-2MFT-T1	2-port RJ-48 multiflex trunk-T1	All Cisco 2800 series platforms
VWIC-2MFT-T1-DI	2-port RJ-48 multiflex trunk-T1with drop and insert	All Cisco 2800 series platforms
VWIC-1MFT-E1	1-port RJ-48 multiflex trunk-E1	All Cisco 2800 series platforms
VWIC-1MFT-G703	1-port RJ-48 multiflex trunk-G.703	All Cisco 2800 series platforms
VWIC-2MFT-E1	2-port RJ-48 multiflex trunk-E1	All Cisco 2800 series platforms
VWIC-2MFT-E1-DI	2-port RJ-48 multiflex trunk-E1 with drop and insert	All Cisco 2800 series platforms
VWIC-2MFT-G703	2-port RJ-48 multiflex trunk-G.703	All Cisco 2800 series platforms
VWIC2-1MFT-T1/E1	1-port T1/E1 multiflex trunk VWIC	Cisco 2801, Cisco 2811, Cisco 2821, Cisco 2851
VWIC2-2MFT-T1/E1	2-port T1/E1 multiflex trunk VWIC	Cisco 2801, Cisco 2811, Cisco 2821, Cisco 2851
VWIC2-1MFT-G703	1-port G.703 multiflex trunk VWIC	Cisco 2801, Cisco 2811, Cisco 2821, Cisco 2851
VWIC2-2MFT-G703	2-port G.703 multiflex trunk VWIC	Cisco 2801, Cisco 2811, Cisco 2821, Cisco 2851
EC-MFT-32	32 channel multiflex trunk dedicated echo cancellation module (ECAN modules)	Cisco 2801, Cisco 2811, Cisco 2821, Cisco 2851
EC-MFT-64	64 channel multiflex trunk dedicated echo cancellation module (ECAN modules)	Cisco 2801, Cisco 2811, Cisco 2821, Cisco 2851
VICs		
VIC-2DID	2-port DID voice and fax interface card	All Cisco 2800 series platforms

Table 3 Supported Modules and Interface Cards for the Cisco 2800 Series Routers (Continued)

Network Module	Product Description	Supported Platforms
VIC-1J1	1-port digital VIC 1J1 for Japan	Cisco 2811, Cisco 2821, Cisco 2851
VIC-4FXS/DID	4-port FXS or DID VIC	All Cisco 2800 series platforms
VIC2-2FXS	2-port VIC-FXS	All Cisco 2800 series platforms
Interface-Card Support		
VIC2-2FXO	2-port VIC-FXO (universal)	All Cisco 2800 series platforms
VIC2-4FXO	4-port VIC-FXO (universal)	All Cisco 2800 series platforms
VIC2-2E/M	2-port VIC-E&M	All Cisco 2800 series platforms
VIC2-2BRI-NT/TE	2-port VIC card–BRI (NT and TE)	All Cisco 2800 series platforms
Advanced Integration Modules		
AIM-ATM	High-performance ATM SAR AIM	Cisco 2811, Cisco 2821, Cisco 2851
AIM-COMPR2-V2	Data compression AIM	Cisco 2811, Cisco 2821, Cisco 2851
AIM-CUE	Cisco Unity Express voice-mail AIM	All Cisco 2800 series platforms
AIM-VPN/EPII-PLUS	Enhanced-performance DES, 3DES, AES, and compression VPN encryption AIM	All Cisco 2800 series platforms
AIM-VPN/SSL-2	Encryption module support	All Cisco 2800 series platforms
DigitaL Modem Network Modules		
PVDM2-12DM	12--port digital modem module	Cisco 2811, Cisco 2821, Cisco 2851
PVDM2-24DM	24-port digital modem module	Cisco 2811, Cisco 2821, Cisco 2851
PVDM2-36DM	36-port digital modem module	Cisco 2811, Cisco 2821, Cisco 2851
DSP (PVDM) Support on Motherboard Slots		
PVDM2-8	8-channel fax and voice DSP module	All Cisco 2800 series platforms
PVDM2-16	16-channel fax and voice DSP module	All Cisco 2800 series platforms
PVDM2-32	32-channel fax and voice DSP module	All Cisco 2800 series platforms
PVDM2-48	48-channel fax and voice DSP module	All Cisco 2800 series platforms
PVDM2-64	64-channel fax and voice DSP module	All Cisco 2800 series platforms
USB Memory Options		
MEMUSB-64FT	64 MB USB flash token	Cisco 1800, Cisco 2800, Cisco 3800 series platforms
MEMUSB-128FT	128 MB USB flash token	Cisco 1800, Cisco 2800, Cisco 3800 series platforms
MEMUSB-256FT	256 MB USB flash token	Cisco 1800, Cisco 2800, Cisco 3800 series platforms

Feature Support

For feature support in Cisco IOS Release 12.4T, see the "Feature Support" section on page 7.

Additional Notes for the Cisco 2800 Series Routers

This section contains important information about using the Cisco 2800 series routers with Cisco IOS Release 12.4T software.

BGP in IP Base

BGP is available in the "IP base" software package for Cisco 1841, Cisco 2800 family, and Cisco 3800 family routers.

Cisco 3200 Series Rugged Integrated Service Routers

This section contains the following sections with information that is specific to the Cisco 3200 series rugged integrated service routers (ISR):

- Introduction, page 58
- Memory Recommendations, page 58
- Supported Hardware, page 58
- Feature Support, page 59
- Additional Notes for the Cisco 3200 Series Rugged Integrated Service Routers, page 59

Introduction

The Cisco 3200 series rugged integrated service routers (formerly named Cisco 3200 series of wireless and mobile access routers) offer secure data, voice, and video communications across a wide range of different wireless and wired networks. These routers deliver always-on IP connectivity for networks in motion. They support Cisco IOS mobile networks, and enable these networks to hide the IP roaming from the local IP nodes. This, in turn, enables IP hosts on a mobile network to connect transparently to the parent network while a router is in motion. The Cisco 3200 series routers are highly ruggedized, can be installed in harsh environments with the proper enclosure, and are intended to be mounted in a vehicle.

For detailed information about the Cisco 3200 series routers, see the documents at the following location:

http://www.cisco.com/univercd/cc/td/doc/product/access/mar_3200/index.htm

Memory Recommendations

For memory recommendations for the Cisco 3200 series routers in Cisco IOS Release 12.4, see the "Memory Recommendations" section on page 8.

Supported Hardware

Cisco IOS Release 12.4T supports the following Cisco 3200 series routers:

- Cisco 3220 is a preconfigured model designed for volume deployments in public safety and transportation with 1 WMIC as an optional bundle.
- Cisco 3250 is a fully configurable model designed for defense customers and command and control vehicles with interface card combinations that allow for more numerous serial or FE port combinations.
- Cisco 3270 is designed to provide wired and wireless network connectivity in harsh environments, such as police cars, military vehicles, trains, airborne vehicles, and outdoor locations that are exposed to the elements.

For detailed descriptions of the new hardware features, see the "New and Changed Information" section on page 101.

For additional information about supported hardware for this platform and release, see the Cisco Software Advisor at the following location:

http://tools.cisco.com/Support/Fusion/FusionHome.do

The following Cisco cards are supported on the Cisco 3200 series routers:

- The Mobile Access Router Card (MARC), which includes the host processor, memory, one 10/100 Ethernet port, one console port, and one auxiliary port.
- The Serial Mobile Interface Card (SMIC), which supports either two or four synchronous/asynchronous serial ports.
- The Fast Ethernet Switch Mobile Interface Card (FESMIC), which supports either two or four autosensing switched ports and LEDs.
- The 2.4GHz Wireless Mobile Interface Card (WMIC), which provides one autosensing 10/100 Ethernet port, an 802.11b/g radio, and connectors for tricolor LEDs.
- The 4.9GHz Wireless Mobile Interface Card (WMIC), which provides one autosensing 10/100 Ethernet port, a 4.9GHz radio, and connectors for tricolor LEDs

Feature Support

For feature support in Cisco IOS Release 12.4T, see the "Feature Support" section on page 7.

Additional Notes for the Cisco 3200 Series Rugged Integrated Service Routers

Cisco 3200 Router

Cisco IOS Release 12.4(15)XZ introduced CU-CME support on the Cisco 3230/3250 and Cisco 3270 router platforms. Due to memory size limitations on the Cisco 3230/3250 router card, CUCME feature enhancements will be limited to Cisco IOS Release 12.4(15)XZ and Cisco IOS Release 12.4(20)T. Customers that wish to activate CUCME on the Cisco 3230/3250 will need to use the Adventerprisek9 Cisco 3230/3250 image based off Cisco IOS Release 12.4(15)XZ.

The Cisco 3270 platform will continue to support additional CUCME feature enhancements beyond the Cisco IOS Release 12.4(15)XZ. Reference the CUCME technical guides for new feature support on the Cisco 3270 platforms in future CUCME releases.

Cisco 3600 Series Routers

This section contains the following sections with information that is specific to the Cisco 3600 series routers:

- Introduction, page 60
- Memory Recommendations, page 60
- Supported Hardware, page 60
- Feature Support, page 66
- Additional Notes for the Cisco 3600 Series Routers, page 66

Introduction

The Cisco 3600 series comprises the Cisco 3631and Cisco 3660 routers. As modular solutions, the Cisco 3600 series routers enable corporations to increase dialup density and take advantage of current and emerging WAN technologies and networking capabilities. The Cisco 3600 series routers are fully supported by Cisco IOS software, which includes dialup connectivity, LAN-to-LAN routing, data and access security, WAN optimization, and multimedia features.

Memory Recommendations

For memory recommendations for the Cisco 3600 series routers in Cisco IOS Release 12.4T, see the "Memory Recommendations" section on page 8.

Supported Hardware

Cisco IOS Release 12.4T supports the following Cisco 3600 series routers:

- Cisco 3631
- Cisco 3660

For detailed descriptions of the new hardware features, see the "New and Changed Information" section on page 101.

For additional information about supported hardware for this platform and release, see the Cisco Software Advisor at the following location:

http://tools.cisco.com/Support/Fusion/FusionHome.do

Table 4 lists the supported interfaces for the Cisco 3600 series routers for Cisco IOS Release 12.4T.

Table 4 Supported Interfaces for the Cisco 3600 Series Routers

Interface, Network Module, or Data Rate	Product Description	Supported Platforms
Dial Access Network Modules	16- and 32-port asynchronous (NM-16A and NM-32A)	Cisco 3631and Cisco 3660
	4- and 8-port synchronous/asynchronous (NM-4A/S and NM-8A/S)	Cisco 3631and Cisco 3660
	6- to 30-port integrated digital modems network modules (NM-6DM, NM-12-DM, NM-18DM, NM-24DM, NM-40DM)	Cisco 3660 only
	6-port digital modem upgrade (MICA-6MOD)	Cisco 3660 only
	8- or 16-port integrated analog network modules (NM-8AM and NM16AM)	Cisco 3660 only
LAN Interfaces	1- and 4-port Ethernet (AUI and 10BASE-T, NM-1E, and NM-4E)	Cisco 3660 only
	1-port Fast Ethernet (100BASE-TX and 100BASE-FX, NM-1FE-TX and NM-1FE-FX)[1]	Cisco 3660 only
	Gigabit Ethernet network module (NM-1GE) with 1 GBIC slot	Cisco 3660 only
Fast Ethernet Switch Network Modules	16-port Ethernet Switch Module for 2600 or 3600 (NM-16ESW)	Cisco 3660 only
	36-port Ethernet Switch Module for 2600 or 3600 (NM-36ESW)	Cisco 3660 only

Table 4 Supported Interfaces for the Cisco 3600 Series Routers (Continued)

Interface, Network Module, or Data Rate	Product Description	Supported Platforms
Mixed Media Network Modules	1-port 10/100BASE-TX with 1-port channelized/PRI/E1 balanced mode (NM-1FE1CE1B)	Cisco 3660 only
	1-port 10/100BASE-TX with 1-port channelized/PRI/E1 unbalanced mode (NM-1FE1CE1U)	Cisco 3660 only
	1-port 10/100BASE-TX with 1-port channelized/PRI/T1 (NM-1FE1CT1)	Cisco 3660 only
	1-port 10/100BASE-TX with 1-port channelized/PRI/T1 with CSU (NM-1FE1CT1-CSU)	Cisco 3660 only
	1-port 10/100BASE-TX with 2-port channelized/PRI/E1 balanced mode (NM-1FE2CE1B)	Cisco 3660 only
	1-port 10/100BASE-TX with 2-port channelized/PRI/E1 unbalanced mode (NM-1FE2CE1U)	Cisco 3660 only
	1-port 10/100BASE-TX with 2-port channelized/PRI/T1 (NM-1FE2CT1)	Cisco 3660 only
	1-port 10/100BASE-TX with 2-port channelized/PRI/T1 with CSU (NM-1FE2CT1-CSU)	Cisco 3660 only
	1 Ethernet and 2 WAN card slots (NM-1E2W)	Cisco 3660 only
	1 Ethernet, 1 Token Ring, and 2 WAN card slots (NM-1E1R2W)	Cisco 3660 only
	2 Ethernet and 2 WAN card slots (NM-2E2W)	Cisco 3660 only
	1-port Fast Ethernet, 1-port Token Ring with 2 WAN card slots (NM-1FE1R2W[=])	Cisco 3660 only
	1-port Fast Ethernet with 2 WAN card slots (NM-1FE2W[=])	Cisco 3660 only
	2-port Fast Ethernet with 2 WAN card slots (NM-2FE2W[=])	Cisco 3660 only
	2 WAN card slots (NM-2W[=])	Cisco 3660 only

Table 4 Supported Interfaces for the Cisco 3600 Series Routers (Continued)

Interface, Network Module, or Data Rate	Product Description	Supported Platforms
Multiport T1/E1 ATM Network Modules with Inverse Multiplexing over ATM (IMA)[2]	1-port ATM-25 network modules (NM-1ATM-25)[2]	Cisco 3660 only
	1-port ATM T3 network module (NM-1A-T3)[2]	Cisco 3660 only
	4-port T1 ATM network module with IMA (NM-4T1-IMA)	Cisco 3631 and Cisco 3660
	4-port E1 ATM network module with IMA (NM-4E1-IMA)	Cisco 3631 and Cisco 3660
	8-port T1 ATM network module with IMA (NM-8T1-IMA)	Cisco 3631 and Cisco 3660
	8-port E1 ATM network module with IMA (NM-8E1-IMA)	Cisco 3631 and Cisco 3660
	1-port ATM E3 network module (NM-1A-E3)[2]	Cisco 3660 only
	1-port ATM OC-3 network module with multimode fiber (NM-1A-OC3MM)	Cisco 3660 only
	1-port ATM OC-3 network module with single-mode intermediate reach fiber (NM-1A-OC3SMI)	Cisco 3660 only
	1-port ATM OC-3 network module with single-mode long reach fiber (NM-1A-OC3SML)	Cisco 3660 only
	1-port ATM OC-3 multimode network module and circuit emulation service (NM-1A-OC3MM-1V)[3]	Cisco 3660 only
	1-port ATM OC-3 single-mode, intermediate reach network module, and circuit emulation service (NM-1A-OC3SMI-1V)[3]	Cisco 3660 only
	1-port ATM OC-3 single-mode, long reach network module, and circuit emulation service (NM-1A-OC3SML-1V)[3]	Cisco 3660 only

Table 4 Supported Interfaces for the Cisco 3600 Series Routers (Continued)

Interface, Network Module, or Data Rate	Product Description	Supported Platforms
Digital T1/E1 Packet Voice Trunk Network Modules and Spare Components	1-port, 24-channel T1 voice/fax module supports 24 channels of medium-complexity codecs: G.729a/b, G.726, G.711, and fax; or 12 channels of G.726, G.729, G.723.1, G.728, G.729a/b, G.711, and fax. Consists of 1 NM-HDV, 2 PVDM-12s, and 1 VWIC-1MFT-T1.[4] Part number: NM-HDV-1T1-24.	Cisco 3660 only
	1-port, enhanced 24-channel T1 voice/fax module supports 24 channels of high- and medium-complexity codecs: G.729a/b, G.726, G.729, G.728, G.723.1, G.711, and fax. Consists of 1 NM-HDV, 4 PVDM-12s, and 1 VWIC-1MFT-T1.[3] Part number: NM-HDV-1T1-24E.	Cisco 3660 only
	2-port, 48-channel T1 voice/fax module supports add/drop multiplexing (drop and insert); 48 channels of medium-complexity codecs: G.729a/b, G.726,G.711, and fax; or 24 channels of G.726, G.729, G.723.1, G.728, G.729a/b, G.711, and fax. Consists of 1 NM-HDV, 4 PVDM-12, and 1 VWIC-2MFT-T1-DI.[3] Part number: NM-HDV-2T1-48.	Cisco 3660 only
	1-port, 30-channel E1 voice/fax module supports 30 channels of G.729a/b, G.726, G.711, and fax or 18 channels of G.726, G.729, G.723.1, G.728, G.729a/b, G.711, and fax. Consists of 1 NM-HDV, 3 PVDM-12s, and 1 VWIC-1MFT-E1.[4] Part number: NM-HDV-1E1-30(=)	Cisco 3660 only
	1-port, enhanced 30-channel E1 voice/fax module supports 30 channels of G.729a/b, G.726, G.729, G.728, G.723.1, G.711, and fax. Consists of 1 NM-HDV, 5 PVDM-12s, and 1 VWIC-1MFT-E1.[4] Part number: NM-HDV-1E1-30E(=).	Cisco 3660 only
	2-port, 60-channel E1 voice/fax module supports add/drop multiplexing (drop and insert); 60 channels of G.729a/b, G.726, G.711, and fax or 30 channels of G.726, G.729, G.723.1, G.728, G.729a/b, G.711, and fax. Consists of 1 NM-HDV, 5 PVDM-12s, and 1 VWIC-2MFT-E1-D1.[4] Part number: NM-HDV-2E1-60(=).	Cisco 3660 only
	High-density voice/fax network module spare. Part number: NM-HDV.	Digital T1 packet voice trunk network modules spare component
	12-channel packet voice DSP module upgrade spare. Part number: PVDM-12=.	Digital T1 packet voice trunk network modules spare component
	1-port RJ-48 multiflex trunk—T1 (VWIC-1MFT-T1)[3]	Digital T1 packet voice trunk network modules spare component
	2-port RJ-48 multiflex trunk—T1 (VWIC-2MFT-T1)[3]	Digital T1 packet voice trunk network modules spare component
	2-port RJ-48 multiflex trunk with drop and insert—T1 (VWIC-2MFT-T1-DI(=))[3]	Digital T1 packet voice trunk network modules spare component

Table 4 Supported Interfaces for the Cisco 3600 Series Routers (Continued)

Interface, Network Module, or Data Rate	Product Description	Supported Platforms
T1/E1 Multiflex Voice/WAN Interface Cards	1-port T1 multiflex trunk interface (VWIC-1MFT-T1)	Cisco 3631 and Cisco 3660
	1-port E1 multiflex trunk interface (VWIC-1MFT-E1)	Cisco 3631 and Cisco 3660
	2-port T1 multiflex trunk interface (VWIC-2MFT-T1)	Cisco 3631 and Cisco 3660
	2-port T1 multiflex trunk interface with drop and insert (VWIC-2MFT-T1-DI)[5]	Cisco 3631 and Cisco 3660
	2-port E1 multiflex trunk interface with drop and insert (VWIC-2MFT-E1-DI)	Cisco 3631 and Cisco 3660
Voice/Fax Interfaces and Network Modules[3]	1- and 2-port voice/fax network module (NM-1V and NM-2V)	Cisco 3660 only
	2-port E&M voice interface card (VIC) (VIC-2E/M)	Cisco 3660 only
	2-port FXO VIC (VIC-2FXO, VIC-2FXO-M3, and VIC-2FXO-EU)	Cisco 3660 only
	2-port FXS VIC	Cisco 3660 only
WAN Data Rates	48/56/64 kbps	Cisco 3660 only
	1.544/2.048 Mbps	Cisco 3660 only
	Up to 8 Mbps on 4-port serial network module	Cisco 3660 only
	52 Mbps max using HSSI network module	Cisco 3660 only
	Up to 100 Mbps on ATM OC-3 network modules	Cisco 3660 only
ISDN Channelized and Serial Network Modules	1- and 2-port channelized T1 module without CSUs (NM-1CT1 and NM-1CT1)	Cisco 3631 and Cisco 3660
	1- and 2-port channelized T1 network module with CSUs (NM-1CT1-CSU and NM-2CT1-CSU)	Cisco 3631 and Cisco 3660
	1- and 2-port E1 network module unbalanced mode (NM-1CE1U and NM-2CE1U)	Cisco 3631 and Cisco 3660
	1- and 2-port E1 network modules balanced mode (NM-1CE1B and NM-2CE1B)	Cisco 3631 and Cisco 3660
	1-port HSSI network module	Cisco 3631 and Cisco 3660
	4- and 8-port BRI network module with NT-1 (NM-4B-U and NM-8B-U)	Cisco 3631 and Cisco 3660
	4- and 8-port BRI network module with S/T interface (NM-4B-S/T and NM-8B-S/T)	Cisco 3631 and Cisco 3660
	4-port serial (NM-4T)	Cisco 3660 only
Other Network Modules	E1 data compression Advanced Integration Module (AIM) (AIM-COMPR4)	Cisco 3660 only
	Hardware encryption AIM	Cisco 3660 only
	Hardware encryption AIM (AIM-VPN)	Cisco 3660 only
	Hardware encryption AIM (AIM-VPNII)	Cisco 3631 and Cisco 3660

Table 4 Supported Interfaces for the Cisco 3600 Series Routers (Continued)

Interface, Network Module, or Data Rate	Product Description	Supported Platforms
WAN Interface Cards	1-Port ADSL WAN interface card (WIC)	Cisco 3660 only
	1-port T1/fractional T1/DSU/CSU WIC (WIC-1DSU-T1)	Cisco 3660 only
	1-port T1/fractional T1 56/64-kbps DSU/CSU WIC (WIC-1DSU-56K4)	Cisco 3631 and Cisco 3660
	1-port ISDN with NT-1 WIC (BRI WIC)[6]	Cisco 3631 and Cisco 3660
	1-port ISDN WIC (WIC-1B-S/T)	Cisco 3631 and Cisco 3660
	1-port serial WIC (WIC-1T)	Cisco 3660 only
	2-port serial (WIC-2T[=])[7]	Cisco 3631 and Cisco 3660
	2-port asynchronous/synchronous (WIC-2A/S[=])	Cisco 3631 and Cisco 3660
Content Engine Network Modules	NM-CE-BP-20G-K9, Content Engine NM-Basic Perf-20GB	Cisco 3660 only
	NM-CE-BP-40G-K9, Content Engine NM-Basic Perf-40GB	Cisco 3660 only
	NM-CE-BP-SCSI-K9, Content Engine NM-Basic Perf-SCSI	Cisco 3660 only

1. The NM-1FE-FX network module is end of life. A replacement part, the NM-1FE-FX-V2, will be supported along with the NM-1FE-FX.
2. Requires the Cisco IOS Plus feature sets.
3. For the Cisco 3660 series only, online insertion and removal (OIR) is supported in Cisco IOS Release 12.4.
4. See T1/E1 multiflex voice/WAN interface cards in this table.
5. For the Cisco 3660 series, only supported in T1/E1 digital packet voice trunk network modules and new Fast Ethernet mixed media network modules: NM-1FE2W, NM-2FE2W, NM-1FE1R2W, NM-2W.
6. The BRI WIC replaces the WIC-1B-U in Cisco IOS Release 12.3.
7. Supported in Fast Ethernet mixed media network modules: NM-1FE2W, NM-2FE2W, NM-1FE1R2W, NM-2W.

Feature Support

For feature support in Cisco IOS Release 12.4T, see the "Feature Support" section on page 7.

Additional Notes for the Cisco 3600 Series Routers

This section contains important information about using the Cisco 3600 series routers with Cisco IOS Release 12.4T software.

CLI Command Added

The following command-line interface (CLI) command was added to Cisco IOS Release 12.2(2)T and is available in later versions:

ip qos dscp [**0-63** | **af11-af43** | **cs1-cs7** | **default** | **ef**] [**media** | **signaling**]

This command replaces the **ip precedence 0-7** VoIP dial-peer command. It implements RFC 2474, which specifies bits 0 to 5 of the IP ToS byte as the differentiated services code point (DSCP), with acceptable values ranging from 0 to 63. Traffic is treated in a unique manner according to the value of the DSCP. The expected treatment of this marked traffic is defined as a per-hop behavior (PHB). RFC 2474 also defines a set of PHBs to forward traffic at least as well as expected with the IP precedence bits (bits 0 to 2) of the old ToS byte marked. The DSCP values for these precedence-compatible

behaviors are *xxx*000, with the values of *xxx* ranging from 1 to 7 and the code points called Class Selector Code Points (*cs1-cs7* in the command shown above). The default value is 000000 for media and signaling.

Two other RFCs have also defined PHBs. RFC 2597 defines the Assured Forwarding PHB Group. With Assured Forwarding (*af11-af43*), bits 0 to 2 represent the class of traffic stream, and bits 3 to 5 represent the drop priority of a traffic stream. RFC 2598 defines the Expedited Forwarding PHB Group and is intended to be used with media streams. Because it is possible that more PHB groups will be defined or that end users will want to experiment with a DSCP of their own, you may configure a DSCP with a value of 0 to 63 (rather than being limited to only the currently defined PHBs).

The recommended values are **ip qos dscp ef media** and **ip qos dscp af31 signaling**.

Cisco 3700 Series Routers

This section contains the following sections with information that is specific to the Cisco 3700 series routers:

- Memory Recommendations, page 68
- Supported Hardware, page 68
- Feature Support, page 72

Memory Recommendations

For memory recommendations for the Cisco 3700 series routers in Cisco IOS Release 12.4T, see the "Memory Recommendations" section on page 8.

Supported Hardware

Cisco IOS Release 12.4T supports the following Cisco 3700 series routers:

- Cisco 3725 application service router
- Cisco 3745 application service router

For detailed descriptions of the new hardware features, see the "New and Changed Information" section on page 101.

For additional information about supported hardware for this platform and release, see the Cisco Software Advisor at the following location:

http://tools.cisco.com/Support/Fusion/FusionHome.do

Table 5 lists the supported interfaces for the Cisco 3700 series routers for Cisco IOS Release 12.4T.

Table 5 Supported Interfaces for the Cisco 3700 Series Routers

Network Modules, VICs, and AIMs	Product Description	Supported Platforms
Serial Network Modules		
NM-4A/S	4-port async/sync serial network module	All Cisco 3700 series platforms
NM-4T	4-port serial (NM-4T)	All Cisco 3700 series platforms
NM-8A/S	8-port async/sync serial network module	All Cisco 3700 series platforms
NM-16A	16-port asynchronous	All Cisco 3700 series platforms
NM-32A	32-port asynchronous	All Cisco 3700 series platforms
NM-1HSS1	1-port high-speed serial interface (HSSI) module	All Cisco 3700 series platforms
LAN Network Modules and Mixed-Media LAN and WAN		
NM-2W	2 WAN card slots	All Cisco 3700 series platforms
NM-1FE2W	1-port 10/100 Ethernet 2 WAN card slot network module	All Cisco 3700 series platforms
NM-1FE1R2W	1-port 10/100 Ethernet 1 4/16 Token Ring 2 WAN card slot network module	All Cisco 3700 series platforms

Table 5 Supported Interfaces for the Cisco 3700 Series Routers (Continued)

Network Modules, VICs, and AIMs	Product Description	Supported Platforms
NM-2FE2W	2-port 10/100 Ethernet 2 WAN card slot network module	All Cisco 3700 series platforms
NM-1FE-FX[1]	1-port Fast Ethernet network module (10/100BASE fiber only)	All Cisco 3700 series platforms
Digital Packet Voice and Fax Trunk Network Modules		
NM-HDV-1T1-12	High density voice network module, with 1 VWIC-1MFT-T1 and 1 PVDM-12	All Cisco 3700 series platforms
NM-HDV-1E1-12	High density voice network module, with 1 VWIC-1MFT-E1 and 1 PVDM-12	All Cisco 3700 series platforms
NM-HDV-1E1-30	Single-port, 30-channel E1 voice/Fax network module (supports 30 channels of medium-complexity VoCoders: G.729a/b, G.726, G.711, and fax or 12 channels of G.726, G.729, G.723.1, G.728, G.729a/b, G.711, and fax).	All Cisco 3700 series platforms
NM-HDV-1E1-30E	Single-port, enhanced 30-channel E1 voice/fax network module (supports 30 channels of high- and medium-complexity VoCoders: G.729a/b, G.726, G.729, G.728, G.723.1, G.711, and fax).	All Cisco 3700 series platforms
NM-HDV-2E1-60	Dual-port, 60-channel E1 voice/fax network module (supports 60 channels of medium-complexity VoCoders: G.729a/b, G.726, G.711, and fax or 30 channels of G.726, G.729, G.723.1, G.728, G.729a/b, G.711, and fax). Supports add/drop multiplexing (drop and insert).	All Cisco 3700 series platforms
NM-HDV-1T1-24	Single-port, 24-channel T1 voice/fax network module (supports 24 channels of medium-complexity VoCoders: G.729a/b, G.726, G.711, and fax or 12 channels of G.726, G.729, G.723.1, G.728, G.729a/b, G.711, and fax).	All Cisco 3700 series platforms
NM-HDV-1T1-24E	Single-port, enhanced 24-channel T1 voice/fax network module (supports 24 channels of high- and medium-complexity VoCoders: G.729a/b, G.726, G.729, G.728, G.723.1, G.711, and fax).	All Cisco 3700 series platforms
NM-HDV-2T1-48	Dual-port, 48-channel T1 voice/fax network module (supports 48 channels of medium-complexity VoCoders: G.729a/b, G.726, G.711, and fax or 24 channels of G.726, G.729, G.723.1, G.728, G.729a/b, G.711, and fax). Supports add/drop multiplexing (drop and insert).	All Cisco 3700 series platforms
Advanced Integration Module (AIM)		
AIM-COMPR4	Data compression AIM for 3660 series (4 E1 performance)	All Cisco 3700 series platforms
AIM-VPN/HP	DES/3DES VPN encryption AIM for 3660-high performance	Cisco 3745 only
AIM-VPN/EP	DES/3DES VPN encryption AIM for 2600-enhanced performance	All Cisco 3700 series platforms
AIM-VPN/HPII	DES/3DES VPN encryption AIM high performance	Cisco 3745 only
AIM-VPN/EPII	DES/3DES VPN encryption AIM extended performance	All Cisco 3700 series platforms
AIM-ATM	ATM SAR AIM	All Cisco 3700 series platforms

Table 5 Supported Interfaces for the Cisco 3700 Series Routers (Continued)

Network Modules, VICs, and AIMs	Product Description	Supported Platforms
AIM-VPN/SSL-3	Encryption module support	All Cisco 3700 series platforms
AIM-VOICE-30	30-channel DSP AIM	All Cisco 3700 series platforms
AIM-ATM-VOICE-30	ATM SAR with 30-channel DSP AIM	All Cisco 3700 series platforms
Analog Packet Voice and Fax Trunk		
NM-1V	1-slot voice and fax network module	All Cisco 3700 series platforms
NM-2V	2-slot voice and fax network module	All Cisco 3700 series platforms
NM-HDA	High density analog module	All Cisco 3700 series platforms
Voice Interface Cards		
VIC-2FXS	2-port VIC—FXS	All Cisco 3700 series platforms
VIC-2FXO	2-port VIC—FXO	All Cisco 3700 series platforms
VIC-2FXO-EU	2-port VIC—FXO for Europe	All Cisco 3700 series platforms
VIC-2FXO-M1	2-port VIC—FXO with battery reversal, for North America	All Cisco 3700 series platforms
VIC-2FXO-M2	2-port VIC—FXO with battery reversal, for Europe	All Cisco 3700 series platforms
VIC-2FXO-M3	2-port VIC—FXO for Australia	All Cisco 3700 series platforms
VIC-2/EM	2-port VIC—E&M	All Cisco 3700 series platforms
VIC-2DID	2-port VIC—Direct Inward Dial (DID)	All Cisco 3700 series platforms
VIC-2BRI-S/T-TE	2-port VIC—BRI (terminal side)	All Cisco 3700 series platforms
VIC-2BRI-NT/TE	2-port VIC—BRI (network side)	All Cisco 3700 series platforms
ATM Network Modules		
NM-4T1-IMA	4-port T1 ATM network module with inverse multiplexing over ATM (IMA)	All Cisco 3700 series platforms
NM-4E1-IMA	4-port E1 ATM network module with IMA	All Cisco 3700 series platforms
NM-8T1-IMA	8-port T1 ATM network module with IMA	All Cisco 3700 series platforms
NM-8E1-IMA	8-port E1 ATM network module with IMA	All Cisco 3700 series platforms
NM-1A-T3	1-port DS3 ATM network module	All Cisco 3700 series platforms
NM-1A-E3	1-port E3 ATM network module	All Cisco 3700 series platforms
NM-1A-OC3-MM	1-port ATM OC-3 network module with multimode fiber	Cisco 3725 only
NM-1A-OC3-SMl	1-port ATM OC-3 network module with single-mode intermediate reach fiber	Cisco 3725 only
NM-1A-OC3-SML	1-port ATM OC-3 network module with single-mode long reach fiber	Cisco 3725 only
NM-1A-OC3-MM-EP	1-port ATM OC-3 network module with multimode fiber extended performance	Cisco 3745 only
NM-1A-OC3-SMl-EP	1-port ATM OC-3 network module with single-mode intermediate reach fiber extended performance	Cisco 3745 only
NM-1A-OC3-SML-EP	1-port ATM OC-3 network module with single-mode long reach fiber extended performance	Cisco 3745 only

Table 5 Supported Interfaces for the Cisco 3700 Series Routers (Continued)

Network Modules, VICs, and AIMs	Product Description	Supported Platforms
Serial WAN Interface Cards		
WIC-1T	1-port serial	All Cisco 3700 series platforms
WIC-2T	2-port serial	All Cisco 3700 series platforms
WIC-2-A/S	2-port synchronous/asynchronous (maximum speed 128 kbps)	All Cisco 3700 series platforms
WIC-1DSU-56K4	1-port, 4-wire 56/64-kbps with CSU/DSU	All Cisco 3700 series platforms
WIC-1DSU-T1	1-port T1 CSU/DSU	All Cisco 3700 series platforms
Digital Voice/WAN Interface Cards		
VWIC-1MFT-T1	1-port RJ-48 multiflex trunk—T1	All Cisco 3700 series platforms
VWIC-2MFT-T1	2-port RJ-48 multiflex trunk—T1	All Cisco 3700 series platforms
VWIC-2MFT-T1-DI	2-port RJ-48 multiflex trunk—T1 with Drop and Insert	All Cisco 3700 series platforms
VWIC-1MFT-E1	1-port RJ-48 multiflex trunk—E1	All Cisco 3700 series platforms
VWIC-2MFT-E1	2-port RJ-48 multiflex trunk—E1	All Cisco 3700 series platforms
VWIC-2MFT-E1-DI	2-port RJ-48 multiflex trunk—E1 with Drop and Insert	All Cisco 3700 series platforms
VWIC-1MFT-G703	1-port RJ-48 multiflex trunk—E1 unstructured	All Cisco 3700 series platforms
VWIC-2MFT-G703	2-port RJ-48 multiflex trunk—E1 unstructured	All Cisco 3700 series platforms
Note Voice/WAN interface cards (VWICs) plug into the voice slots in the high density voice network module, into the WAN slots on the Fast Ethernet mixed media LAN/WAN network modules, or into the WAN slots on the Cisco 3700 series motherboard.		
ISDN WAN Interface Cards		
WIC-1B-S/T	1-port ISDN BRI	All Cisco 3700 series platforms
WIC-1B-U	1-port ISDN BRI with NT1	All Cisco 3700 series platforms
Note Note: WICs plug into the mixed media LAN/WAN network modules or into the WAN slots of the Cisco 3700 series motherboard.		
ISDN and Channelized Serial Network Modules		
NM-1CT1	1-port channelized T1/ISDN PRI network module	All Cisco 3700 series platforms
NM-1CT1-CSU	1-port channelized T1/ISDN PRI with CSU network module	All Cisco 3700 series platforms
NM-2CT1	2-port channelized T1/ISDN PRI network module	All Cisco 3700 series platforms
NM-2CT1-CSU	2-port channelized T1/ISDN PRI with CSU network module	All Cisco 3700 series platforms
NM-1CE1B	1-port channelized E1/ISDN PRI balanced network module	All Cisco 3700 series platforms
NM-1CE1U	1-port channelized E1/ISDN PRI unbalanced network module	All Cisco 3700 series platforms
NM-2CE1B	2-port channelized E1/ISDN PRI balanced network module	All Cisco 3700 series platforms
NM-2CE1U	2-port channelized E1/ISDN PRI unbalanced network module	All Cisco 3700 series platforms
NM-4B-S/T	4-port ISDN BRI network module	All Cisco 3700 series platforms
NM-4B-U	4-port ISDN BRI with NT1 network module	All Cisco 3700 series platforms

Table 5 Supported Interfaces for the Cisco 3700 Series Routers (Continued)

Network Modules, VICs, and AIMs	Product Description	Supported Platforms
NM-8B-S/T	8-port ISDN BRI network module (S/T interface)	All Cisco 3700 series platforms
NM-8B-U	8-port ISDN BRI with NT1 network module (U interface)	All Cisco 3700 series platforms
Modem Modules		
WIC-1AM	1-port analog modem WIC	All Cisco 3700 series platforms
WIC-2AM	2-port analog modem WIC	All Cisco 3700 series platforms
NM-6DM	6-port digital modem network module	All Cisco 3700 series platforms
NM-12DM	12-port digital modem network module	All Cisco 3700 series platforms
NM-18DM	18-port digital modem network module	All Cisco 3700 series platforms
NM-24DM	24-port digital modem network module	All Cisco 3700 series platforms
NM-30DM	30-port digital modem network module	All Cisco 3700 series platforms
NM-8AM	8-port analog modem network module	All Cisco 3700 series platforms
NM-16AM	16-port analog modem network module	All Cisco 3700 series platforms
Digital Subscriber Line (DSL)		
WIC-1ADSL	1-port ADSL WIC	All Cisco 3700 series platforms
WIC-G.SHDSL	1-port G.SHDSL WIC	All Cisco 3700 series platforms
Ethernet Switch		
NM-16ESW	16-port Ethernet switch network module	All Cisco 3700 series platforms
NMD-36ESW	36-port Ethernet switch high-density network Module	All Cisco 3700 series platforms
Content Engine Network Modules		
NM-CE-BP-20G-K9	Content Engine NM-Basic Perf-20GB	All Cisco 3700 series platforms
NM-CE-BP-40G-K9	Content Engine NM-Basic Perf-40GB	All Cisco 3700 series platforms
NM-CE-BP-SCSI-K9	Content Engine NM-Basic Perf-SCSI	All Cisco 3700 series platforms

1. The NM-1FE-FX network module is end of life. A replacement part, the NM-1FE-FX-V2, will be supported along with the NM-1FE-FX.

Feature Support

For feature support in Cisco IOS Release 12.4T, see the "Feature Support" section on page 7.

Cisco 3800 Series Routers

This section contains the following sections with information that is specific to the Cisco 3800 series routers:

- Introduction, page 73
- Memory Recommendations, page 74
- Supported Hardware, page 74
- Feature Support, page 80
- Additional Notes for the Cisco 3800 Series Routers, page 81

Introduction

Cisco 3800 series integrated services routers are part of a new generation of routers that incorporate high-performance integrated data, voice, video, and Virtual Private Network (VPN) capability. They are designed for branch office installations that need integrated low-density switching, security, voice, IP telephony, video, content networking, and concurrent applications.

Two routers in the Cisco 3800 series are the Cisco 3825 router and the Cisco 3845 router. Their features include:

- Two built-in 1000BASE-T Gigabit Ethernet ports with RJ-45 connectors for shielded twisted pair. One of these ports provides a slot for an optional small-form-factor pluggable (SFP) module.
- Hardware-based VPN encryption acceleration.
- Modular design that enables you to add a wide variety of LAN and WAN ports with interchangeable network modules and interface cards.

The Cisco 3825 router provides two slots for network modules. The lower network module slot of this router can hold a single-wide or extended single-wide network module. The upper slot of the Cisco 3825 router can hold a single-wide, extended single-wide, double-wide, or extended double-wide network module.

The Cisco 3845 router provides four slots for network modules. Each slot can hold a single-wide or extended single-wide network module. Slots can be combined in pairs to hold a double-wide or extended double-wide network module.

The Cisco 3825 router and the Cisco 3845 router each provide four interface card slots. Each slot can hold a single-wide WAN interface card (WIC), voice interface card (VIC), voice/data T1/E1 WAN interface card (VWIC), or high-speed WAN interface card (HWIC). Slots can be combined in pairs to hold a double-wide HWIC.

Advanced integration modules (AIMs) and packet voice data modules (PVDMs) install into connectors on the router motherboard. AIMs provide hardware-based support for additional features. PVDMs are digital signal processor (DSP) SIMMs that provide voice support. The Cisco 3825 router and the Cisco 3845 router can each accommodate two AIMs and four PVDMs.

For detailed information about the Cisco 3800 series of routers, see the documents at the following location:

http://www.cisco.com/univercd/cc/td/doc/product/access/acs_mod/3800/hw/index.htm

Memory Recommendations

For memory recommendations for the Cisco Catalyst 4224 Access Gateway Switch in Cisco IOS Release 12.4T, see the "Memory Recommendations" section on page 8.

Supported Hardware

Cisco IOS Release 12.4T supports the following Cisco 3800 series routers:

- Cisco 3825
- Cisco 3845

For detailed descriptions of the new hardware features, see the "New and Changed Information" section on page 101.

For additional information about supported hardware for this platform and release, see the Cisco Software Advisor at the following location:

http://tools.cisco.com/Support/Fusion/FusionHome.do

Table 6 summarizes some typical WAN, LAN, and voice connections for the Cisco 3800 series routers for Cisco IOS Release 12.4T.

Table 6 WAN, LAN, and Voice Connections for the Cisco 3800 Series Routers

Port or Connection	Port Type	Connected To
Ethernet	RJ-45	Ethernet switch
T1/E1 WAN xCE1T1-PRI	RJ-48C RJ-48S	T1 or E1 network External T1 CSU or other T1 equipment
T3/DS3/E3 WAN	BNC connector	T3 network, CSU/DSU, or other T3/DS3 equipment
Cisco serial	60-pin D-sub	CSU/DSU and serial network or equipment
Cisco Smart serial	Cisco Smart compact connector	CSU/DSU and serial network or equipment
ADSL	RJ-11C/CA11A	Network demarcation device for service provider's DSL interface
SHDSL	RJ-11C/CA11A RJ-14	Network demarcation device for service provider's DSL interface
T1/E1 digital voice	RJ-48C/CA81A	Digital PBX, ISDN network, CSU/DSU
Analog voice FXS	RJ-11	Telephone, fax
Analog voice FXO	RJ-11	Central office, analog PBX
Analog voice E&M	RJ-45	Analog PBX
BRI S/T WAN (external NT1)	RJ-45/CB-1D	NT1 device or private integrated network exchange (PINX)
BRI U WAN (built-in NT1)	RJ-49C/CA-A11	ISDN network
BRI NT/TE (built-in NT1)	RJ-45	ISDN terminal equipment and ISDN network
56/64-kbps CSU/DSU	8-pin modular	RJ-48S interface in subrate device or network

Table 6 WAN, LAN, and Voice Connections for the Cisco 3800 Series Routers (Continued)

Port or Connection	Port Type	Connected To
T1/FT1 CSU/DSU	8-pin modular	RJ-48C interface
Gigabit Ethernet SFP, optical	LC	1000BASE-SX, -LX, -LH, -ZX, -CWDM

Table 7 lists the supported interfaces for the Cisco 3800 series routers for Cisco IOS Release 12.4T.

Table 7 Supported Interfaces for the Cisco 3800 Series Routers

Network Module, WIC, VWIC, VIC, AIM, or PVDM	Product Description	Supported Platforms
Ethernet Switching and LAN Modules		
NM-16ESW	16-port 10/100 Cisco EtherSwitch network module	All Cisco 3800 series platforms
NM-16ESW-1GIG	16-port 10/100 Cisco EtherSwitch network module with 1 Gigabit Ethernet (1000BASE-T) port	All Cisco 3800 series platforms
NM-16ESW-PWR	16-port 10/100 Cisco EtherSwitch network module with in-line power support	All Cisco 3800 series platforms
NM-16ESW-PWR-1GIG	16-port 10/100 Cisco EtherSwitch network module with in-line power and Gigabit Ethernet	All Cisco 3800 series platforms
NMD-36ESW	36-port 10/100 Cisco EtherSwitch high-density services module (HDSM)	All Cisco 3800 series platforms
NMD-36ESW-2GIG	36-port 10/100 Cisco EtherSwitch HDSM with 1 Gigabit Ethernet (1000BASE-T) port	All Cisco 3800 series platforms
NMD-36ESW-PWR	36-port 10/100 Cisco EtherSwitch HDSM with in-line power support	All Cisco 3800 series platforms
NMD-36ESW-PWR-2G	36-port 10/100 Cisco EtherSwitch HDSM with in-line power and Gigabit Ethernet	All Cisco 3800 series platforms
NME-16ES-1G-P	1 16-port 10/100 Cisco EtherSwitch service module with 802.3af, 1 10/100/1000 port, and IP base	All Cisco 3800 series platforms
NME-X-23ES-1G-P	1 23-port 10/100 Cisco EtherSwitch service module with 802.3af, 1 10/100/1000 port w/ 802.3af, and IP base	All Cisco 3800 series platforms
NME-XD-24ES-1S-P	1 24-port 10/100 Cisco EtherSwitch service module with 802.3af, 1 SFP, Cisco StackWise connectors, and IP base	All Cisco 3800 series platforms
NME-XD-48ES-2S-P	1 48-port 10/100 Cisco EtherSwitch service module with 802.3af, 2 SFPs, and IP base	All Cisco 3800 series platforms
HWIC-4ESW	4-port single-wide 10/100BASE-T Ethernet switch HWIC	All Cisco 3800 series platforms
HWIC-D-9ESW	(8+1)-port double-wide 10/100BASE-T Ethernet switch HWIC	All Cisco 3800 series platforms
HWIC-4ESW-POE	4-port single-wide 10/100BASE-T Ethernet switch HWIC with integrated in-line power daughter card (802.3af capable)	All Cisco 3800 series platforms
HWIC-D-9ESW-POE	(8+1)-port double-wide 10/100BASE-T Ethernet switch HWIC with integrated in-line power daughter card (802.3af capable)	All Cisco 3800 series platforms

Table 7 Supported Interfaces for the Cisco 3800 Series Routers (Continued)

Network Module, WIC, VWIC, VIC, AIM, or PVDM	Product Description	Supported Platforms
ILPM4	In-line power daughter card for the HWIC-4ESW with 802.3af capability	All Cisco 3800 series platforms
ILPM8	In-line power daughter card for the HWIC-9ESW with 802.3af capability	All Cisco 3800 series platforms
LAN and WIC Combination Network Modules		
NM-1FE1R2W	1 10/100 Ethernet network module with 1 4/16 Token-Ring 2 WAN card slot	All Cisco 3800 series platforms
NM-1FE2W	1 10/100 Ethernet network module with 2 WAN card slots	All Cisco 3800 series platforms
NM-1FE2W-V2	1 10/100 Ethernet network module with 2 WAN card slots	All Cisco 3800 series platforms
NM-2FE2W	2 10/100 Ethernet network modules with 2 WAN card slots	All Cisco 3800 series platforms
NM-2FE2W-V2	2-port 10/100 Ethernet network module with 2 WAN card slots	All Cisco 3800 series platforms
NM-2W	Network module with 2 WAN card slots (no LAN)	All Cisco 3800 series platforms
Serial Connectivity Network Modules		
NM-1T3/E3	1-port clear-channel T3/E3 network module	All Cisco 3800 series platforms
NM-1HSSI	1-port High-Speed Serial Interface (HSSI) network module	All Cisco 3800 series platforms
NM-4A/S	4-port asynchronous/synchronous serial network module	All Cisco 3800 series platforms
NM-8A/S	8-port asynchronous/synchronous serial network module	All Cisco 3800 series platforms
NM-16A/S	16-port asynchronous/synchronous serial network module	All Cisco 3800 series platforms
NM-16A	16-port asynchronous serial network module	All Cisco 3800 series platforms
NM-32A	32-port asynchronous serial network module	All Cisco 3800 series platforms
Channelized T1/E1 and ISDN Network Modules		
NM-1CE1T1-PRI	1-port channelized E1/T1/ISDN PRI network module	All Cisco 3800 series platforms
NM-2CE1T1-PRI	2-port channelized E1/T1/ISDN PRI network module	All Cisco 3800 series platforms
NM-4B-S/T	4-port ISDN BRI network module (S/T interface)	All Cisco 3800 series platforms
NM-4B-U	4-port ISDN BRI network module with integrated NT1 (U interface)	All Cisco 3800 series platforms
NM-8B-S/T	8-port ISDN BRI network module (S/T interface)	All Cisco 3800 series platforms
NM-8B-U	8-port ISDN BRI network module with integrated NT1 (U interface)	All Cisco 3800 series platforms
ATM Network Modules		
NM-1A-T3	1-port DS3 ATM network module	All Cisco 3800 series platforms
NM-1A-E3	1-port E3 ATM network module	All Cisco 3800 series platforms
NM-4T1-IMA	4-port T1 ATM network module with inverse multiplexing over ATM (IMA)	All Cisco 3800 series platforms
NM-4E1-IMA	4-port E1 ATM network module with IMA	All Cisco 3800 series platforms
NM-8T1-IMA	8-port T1 ATM network module with IMA	All Cisco 3800 series platforms
NM-8E1-IMA	8-port E1 ATM network module with IMA	All Cisco 3800 series platforms

Table 7 Supported Interfaces for the Cisco 3800 Series Routers (Continued)

Network Module, WIC, VWIC, VIC, AIM, or PVDM	Product Description	Supported Platforms
Analog Dialup and Remote Access Network Modules		
NM-8AM-V2	8-port analog modem network module with v.92	All Cisco 3800 series platforms
NM-16AM-V2	16-port analog modem network module with v.92	All Cisco 3800 series platforms
Analog and ISDN Basic Rate Voice Network Modules and Accessories		
NM-HD-1V	1-slot IP communications voice and fax network module	All Cisco 3800 series platforms
NM-HD-2V	2-slot IP communications voice and fax network module	All Cisco 3800 series platforms
NM-HD-2VE	2-slot IP communications enhanced voice and fax network module	All Cisco 3800 series platforms
NM-HDA-4FXS	High-density analog voice and fax network module with 4 FXSs	All Cisco 3800 series platforms
EM-HDA-4FXO	4-port FXO voice and fax expansion module	All Cisco 3800 series platforms
EM-HDA-8FXS	8-port FXS voice and fax expansion module	All Cisco 3800 series platforms
EVM-HD-8FXS/DID	High-density analog and digital extension module for voice and fax-8 FXS/DID	All Cisco 3800 series platforms
EM-HDA-8FXS	8-port voice and fax expansion module-FXS	All Cisco 3800 series platforms
EM-4BRI-NT/TE	4-port voice and fax expansion module-BRI (NT and TE)	All Cisco 3800 series platforms
EM-HDA-6FXO	6-port voice and fax expansion module-FXO	All Cisco 3800 series platforms
EM-HDA-3FXS/4FXO	7-port voice and fax expansion module-3FXS/4FXO	All Cisco 3800 series platforms
High-Density Voice Network Modules and Accessories		
NM-HDV2	IP communications high-density voice and fax network module	All Cisco 3800 series platforms
NM-HDV2-1T1/E1	1-port T1/E1 IP communications high-density voice and fax network module	All Cisco 3800 series platforms
NM-HDV2-2T1/E1	2-port T1/E1 IP communications high-density voice and fax network module	All Cisco 3800 series platforms
NM-HDV-1T1-12	1-port 12-channel T1 voice and fax network module; bundle: NM-HDV with 1 VWIC-1MFT-T1 and 1 PVDM-12	All Cisco 3800 series platforms
NM-HDV-1T1-24	1-port 24-channel T1 voice and fax network module;, bundle: NM-HDV with 1 VWIC-1MFT-T1 and 2 PVDM-12s	All Cisco 3800 series platforms
NM-HDV-1T1-24E	Single-port 24-enhanced channel T1 voice and fax network module; bundle: NM-HDV with 1 VWIC-1MFT-T1 and 2 PVDM-12s	All Cisco 3800 series platforms
NM-HDV-2T1-48	2-port 48-channel T1 voice and fax network module; bundle: NM-HDV with 1 VWIC-2MFT-T1-DI and 4 PVDM-12s	All Cisco 3800 series platforms
NM-HDV-1E1-12	1-port 12-channel E1 voice and fax network module; bundle: NM-HDV with 1 VWIC-1MFT-E1 and 1 PVDM-12	All Cisco 3800 series platforms
NM-HDV-1E1-30	1-port 30-channel E1 voice and fax network module; bundle: NM-HDV with 1 VWIC-1MFT-E1 and 3 PVDM-12s	All Cisco 3800 series platforms
NM-HDV-1E1-30E	1-port 30-enhanced-channel E1 voice and fax network module, bundle; NM-HDV with 1 VWIC-1MFT-E1 and 5 PVDM-12s	All Cisco 3800 series platforms

Table 7 Supported Interfaces for the Cisco 3800 Series Routers (Continued)

Network Module, WIC, VWIC, VIC, AIM, or PVDM	Product Description	Supported Platforms
NM-HDV-2E1-60	2-port 60-channel E1 voice and fax network module; bundle: NM-HDV with 1 VWIC-2MFT-E1-DI and 5 PVDM-12s	All Cisco 3800 series platforms
NM-HDV-1J1-30	1-port 30-channel J1 high-density voice network module; bundle: NM-HDV with 3 PVDM-12s and 1 VIC-1J1	All Cisco 3800 series platforms
NM-HDV-1J1-30E	1-port 30-enhanced-channel J1 high-density voice network module; bundle: NM-HDV with 5 PVDM-12s and 1 VIC-1J1	All Cisco 3800 series platforms
NM-HDV-FARM-C36	Network module 36-port DSP farm bundle HDV transcoding and conferencing DSP farm equipped with 2 DSP single in-line memory modules (SIMMs)	All Cisco 3800 series platforms
NM-HDV-FARM-C54	Network module 54-port DSP farm bundle HDV transcoding and conferencing DSP farm equipped with 3 DSP SIMMs	All Cisco 3800 series platforms
NM-HDV-FARM-C90	Network module 90-port DSP farm bundle HDV transcoding and conferencing DSP farm equipped with 5 DSP SIMMs	All Cisco 3800 series platforms
Application Network Modules		
NM-CE-BP-40G-K9	Cisco Content Engine Network Module, basic performance, 40-GB IDE hard disk, 256-MB DRAM	All Cisco 3800 series platforms
NM-CE-BP-80G-K9	Cisco Content Engine Network Module, basic performance, 80-GB IDE hard disk, 512-MB DRAM	All Cisco 3800 series platforms
NM-CE-BP-SCSI-K9	Cisco Content Engine Network Module, basic performance, Small Computer System Interface (SCSI) controller (requires external SCSI disk array)	All Cisco 3800 series platforms
NM-CIDS	Cisco IDS network module	All Cisco 3800 series platforms
NM-NAM	Cisco network analysis module	All Cisco 3800 series platforms
Alarm Monitoring and Control Network Modules and Accessories		
NM-AIC-64	Alarm monitoring and control network module	All Cisco 3800 series platforms
Circuit Emulation over IP (CEoIP) Network Modules		
NM-CEM-4SER	4-port serial circuit emulation over IP network module	All Cisco 3800 series platforms
NM-CEM-4TE1	4-port T1/E1 circuit emulation over IP network module	All Cisco 3800 series platforms
Serial WICs and HWICs		
WIC-1T	1-port high-speed serial WIC	All Cisco 3800 series platforms
WIC-2T	2-port high-speed serial WIC	All Cisco 3800 series platforms
WIC-2A/S	2-port asynchronous/synchronous serial WIC	All Cisco 3800 series platforms
WIC-2A/S	2-port asynchronous/synchronous serial WIC	All Cisco 3800 series platforms
HWIC-4T	4 high-speed serial ports	All Cisco 3800 series platforms
HWIC-4A/S	4 low-speed synchronous/asynchronous serial ports	All Cisco 3800 series platforms
HWIC-8A/S-232	8 low-speed synchronous/asynchronous serial ports, EIA-232 only	All Cisco 3800 series platforms
HWIC-8A	8 asynchronous EIA-232 serial ports	All Cisco 3800 series platforms
HWIC-16A	16 asynchronous EIA-232 serial ports	All Cisco 3800 series platforms

Table 7 Supported Interfaces for the Cisco 3800 Series Routers (Continued)

Network Module, WIC, VWIC, VIC, AIM, or PVDM	Product Description	Supported Platforms
Channel Service Unit/Data Service Unit (CSU/DSU) WICs		
WIC-1DSU-T1-V2	1-port T1/Fractional-T1 DSU/CSU WIC	All Cisco 3800 series platforms
WIC-1DSU-56K4	1-port 4-wire 56-/64-kbps CSU/DSU WIC	All Cisco 3800 series platforms
ISDN BRI WICs		
WIC-1B-S/T-V3	1-port ISDN BRI WIC for dial and lease line	All Cisco 3800 series platforms
WIC-1B-U-V2	1-port ISDN BRI with integrated NT1 (U interface)	All Cisco 3800 series platforms
DSL WICs		
WIC-1ADSL	1-port ADSL over basic telephone service WIC	All Cisco 3800 series platforms
WIC-1ADSL-DG	1-port ADSL over basic telephone service with dying gasp WIC	All Cisco 3800 series platforms
WIC-1ADSL-I-DG	1-port ADSL over ISDN with dying-gasp WIC	All Cisco 3800 series platforms
WIC-1SHDSL	1-port G.SHDSL WIC (two-wire only)	All Cisco 3800 series platforms
WIC-1SHDSL-V2	1-port G.SHDSL WIC (two- or four-wire)	All Cisco 3800 series platforms
Analog Modem WICs		
WIC-1AM	1-port analog modem WIC	All Cisco 3800 series platforms
WIC-2AM	2-port analog modem WIC	All Cisco 3800 series platforms
T1, E1, and G.703 Multiflex Trunk VWICs and WICs		
VWIC-1MFT-T1	1-port RJ-48 multiflex trunk-T1	All Cisco 3800 series platforms
VWIC-2MFT-T1	2-port RJ-48 multiflex trunk-T1	All Cisco 3800 series platforms
VWIC-2MFT-T1-DI	2-port RJ-48 multiflex trunk-T1 with drop and insert	All Cisco 3800 series platforms
VWIC-1MFT-E1	1-port RJ-48 multiflex trunk-E1	All Cisco 3800 series platforms
VWIC-1MFT-G703	1-port RJ-48 multiflex trunk-G.703	All Cisco 3800 series platforms
VWIC-2MFT-E1	2-port RJ-48 multiflex trunk-E1	All Cisco 3800 series platforms
VWIC-2MFT-E1-DI	2-port RJ-48 multiflex trunk-E1 with drop and insert	All Cisco 3800 series platforms
VWIC-2MFT-G703	2-port RJ-48 multiflex trunk-G.703	All Cisco 3800 series platforms
VWIC2-1MFT-G703	1-Port G.703 multiflex trunk VWIC	All Cisco 3800 series platforms
VWIC2-2MFT-G703	2-Port G.703 multiflex trunk VWIC	All Cisco 3800 series platforms
VICs		
VIC-2DID	2-port DID voice and fax interface card	All Cisco 3800 series platforms
VIC-1J1	1-port digital voice interface card (J1) for Japan	All Cisco 3800 series platforms
VIC-4FXS/DID	4-port FXS or DID VIC	All Cisco 3800 series platforms
VIC2-2FXS	2-port VIC-FXS	All Cisco 3800 series platforms
VIC2-2FXO	2-port VIC-FXO (universal)	All Cisco 3800 series platforms
VIC2-4FXO	4-port VIC-FXO (universal)	All Cisco 3800 series platforms
VIC2-2E/M	2-port VIC E&M)	All Cisco 3800 series platforms
VIC2-2BRI-NT/TE	2-port VIC-BRI (NT and TE)	All Cisco 3800 series platforms
Echo Cancellation Modules		

Table 7 Supported Interfaces for the Cisco 3800 Series Routers (Continued)

Network Module, WIC, VWIC, VIC, AIM, or PVDM	Product Description	Supported Platforms
EC-MFT-32	32-channel multiflex trunk dedicated ECAN module	All Cisco 3800 series platforms
EC-MFT-64	64-channel multiflex trunk dedicated ECAN module	All Cisco 3800 series platforms
Gigabit Ethernet High-Speed WIC		
HWIC-1GE-SFP	Cisco Gigabit Ethernet high-speed interface card	All Cisco 3800 series platforms
Access Point HWIC		
HWIC-AP-AG		All Cisco 3800 series platforms
HWIC-AP-G		All Cisco 3800 series platforms
AIMs		
AIM-ATM	High-performance ATM segmentation and reassembly (SAR) AIM	All Cisco 3800 series platforms
AIM-COMP4	Data-compression AIM	All Cisco 3800 series platforms
AIM-CUE	Cisco Unity Express voice-mail AIM	All Cisco 3800 series platforms
AIM-VPN/EPII-PLUS	Enhanced-performance DES, 3DES, AES, and compression VPN encryption AIM for the Cisco 3825	Cisco 3825
AIM-VPN/HPII-PLUS	Enhanced-performance DES, 3DES, AES, and compression VPN encryption AIM for the Cisco 3845	Cisco 3845
AIM-VPN/SSL-3	Encryption module support	All Cisco 3800 series platforms
PVDMs		
PVDM2-8	8-channel fax and voice DSP module	All Cisco 3800 series platforms
PVDM2-16	16-channel fax and voice DSP module	All Cisco 3800 series platforms
PVDM2-32	32-channel fax and voice DSP module	All Cisco 3800 series platforms
PVDM2-48	48-channel fax and voice DSP module	All Cisco 3800 series platforms
PVDM2-64	64-channel fax and voice DSP module	All Cisco 3800 series platforms
USB Memory Options		
MEMUSB-64FT	64-MB USB flash token	All Cisco 3800 series platforms
MEMUSB-128FT	128-MB USB flash token	All Cisco 3800 series platforms
MEMUSB-256FT	256-MB USB flash token	All Cisco 3800 series platforms

Feature Support

For feature support in Cisco IOS Release 12.4T, see the "Feature Support" section on page 7.

Additional Notes for the Cisco 3800 Series Routers

This section contains important information about using the Cisco 3800 series routers with Cisco IOS Release 12.4T software.

BGP in IP Base

BGP is available in the “IP base” software package for Cisco 1841, Cisco 2800 family, and Cisco 3800 family routers.

Cisco AS5350 and Cisco AS5350XM Universal Gateways

This section contains the following sections with information that is specific to the Cisco AS5350 and Cisco AS5350XM universal gateways:

- Introduction, page 82
- Memory Recommendations, page 82
- Supported Hardware, page 82
- Feature Support, page 83

Introduction

The Cisco AS5350 universal gateway is the only one-rack unit, two-, four-, or eight- PRI gateway that provides universal services—data, voice, and fax services on any service, any port. The Cisco AS5350 offers high performance and high reliability in a compact, modular design. This cost-effective platform is suited for Internet service providers (ISPs) and enterprises that require universal services.

Memory Recommendations

For memory recommendations for the Cisco AS5300 universal gateway in Cisco IOS Release 12.4T, see the "Memory Recommendations" section on page 8.

Supported Hardware

Cisco IOS Release 12.4 supports the Cisco AS5350 and Cisco AS5350XM universal gateways.

For detailed descriptions of the new hardware features, see the "New and Changed Information" section on page 101.

For additional information about supported hardware for this platform and release, see the Cisco Software Advisor at the following location:

http://tools.cisco.com/Support/Fusion/FusionHome.do

The following table lists the supported interfaces for the Cisco AS5350 universal gateways.

Table 8 Supported Interfaces for the Cisco AS5350 Universal Gateways

Interfaces and Dial Feature Cards	Product Description
Dial Feature Cards	AS535-DFC-60NP
	AS535-DFC-108NP
	AS535-DFC-CT3
	2 PRI DFC, 4 PRI DFC, 8 PRI DFC
Dial-Only Dial Feature Card[1]	Modem calls, ISDN digital calls, V.110 data calls, and V.120 data calls
LAN Interfaces	Fast Ethernet 10/100BASE-T (RJ-45)
	Gigabit Ethernet 10/100/1000BASE-T (RJ-45)[2]

Table 8 Supported Interfaces for the Cisco AS5350 Universal Gateways (Continued)

Interfaces and Dial Feature Cards	Product Description
Trunk/Backhaul Interface Options	CT3 DFC
	2PRI CT1/CE1 DFC, 4PRI CT1/CE1 DFC, 8PRI CT1/CE1 DFC
	Two 8-MB serial ports

1. The dial-only dial feature card (DFC) is supported on the Cisco AS5xxxXM gateways only.
2. The Cisco AS5xxxXM gateways support the Gigabit Ethernet Interface.

Feature Support

For feature support in Cisco IOS Release 12.4T, see the "Feature Support" section on page 7.

Cisco AS5400, Cisco AS5400HPX, and AS5400XM Universal Gateways

This section contains the following sections with information that is specific to the Cisco AS5400, Cisco AS5400HPX, and Cisco AS5400XM universal gateways:

- Introduction, page 84
- Memory Recommendations, page 84
- Supported Hardware, page 84
- Feature Support, page 85

Introduction

The Cisco AS5400 universal gateway is a two-rack unit, 8-, 12-, or 16-T1/E1, 1-CT3 gateway that provides universal port data, voice, and fax services on any port at any time. The Cisco AS5400 offers high performance and high reliability in a compact, modular design. This platform is intended for Internet service providers (ISPs) and enterprises that require innovative universal services.

Memory Recommendations

For memory recommendations for the Cisco AS5400, Cisco AS5400HPX, and Cisco AS5400XM universal gateways in Cisco IOS Release 12.4T, see the "Memory Recommendations" section on page 8.

Supported Hardware

Cisco IOS Release 12.4 supports the following Cisco AS5400 universal gateways:

- Cisco AS5400
- Cisco AS5400HPX
- Cisco AS5400XM

For detailed descriptions of the new hardware features, see the "New and Changed Information" section on page 101.

For additional information about supported hardware for this platform and release, see the Cisco Software Advisor at the following location:

http://tools.cisco.com/Support/Fusion/FusionHome.do

Table 9 lists the supported interfaces for the Cisco AS5400 universal gateways for Cisco IOS Release 12.4T.

Table 9 Supported Interfaces for the Cisco AS5400 Universal Gateways

Interfaces and Dial Feature Cards	Product Description
Dial Feature Cards	AS54-DFC-CT3
	AS54-DFC-60NP
	AS54-DFC-108NP
	2 PRI DFC, 4 PRI DFC, 8 PRI DFC
Dial-Only Dial Feature Card[1]	Modem calls, ISDN digital calls, V.110 data calls, and V.120 data calls

Table 9 Supported Interfaces for the Cisco AS5400 Universal Gateways (Continued)

Interfaces and Dial Feature Cards	Product Description
LAN Interfaces	Fast Ethernet 10/100BASE-T (RJ-45)
	Gigabit Ethernet 10/100/1000BASE-T (RJ-45)[2]
Trunk/Backhaul Interface Options	2PRI CT1/CE1 DFC, 4PRI CT1/CE1 DFC, 8PRI CT1/CE1 DFC
	CT3 DFC
	2 serial ports on the motherboard

1. The dial-only dial feature card (DFC) is supported on the Cisco AS5xxxXM gateways only.
2. The Cisco AS5xxxXM gateways support the Gigabit Ethernet Interface.

Feature Support

For feature support in Cisco IOS Release 12.4T, see the "Feature Support" section on page 7.

Cisco AS5850 Universal Gateways

This section contains the following sections with information that is specific to the Cisco AS5850 universal gateway:

- Introduction, page 86
- Memory Recommendations, page 86
- Supported Hardware, page 86
- Feature Support, page 87

Introduction

The Cisco AS5850 universal gateway provides the highest concentration of port and ISDN terminations available in a single remote access server product. The Cisco AS5850 is specifically designed to meet the demands of large service providers such as Post, Telephone, and Telegraphs (PTTs), regional bell operating companies (RBOCs), interexchange carriers (IXCs), and large Internet service providers (ISPs).

Memory Recommendations

For memory recommendations for the Cisco AS5850 universal gateway in Cisco IOS Release 12.4T, see the "Memory Recommendations" section on page 8.

Supported Hardware

Cisco IOS Release 12.4T supports the Cisco AS5850 universal gateways.

For detailed descriptions of the new hardware features, see the "New and Changed Information" section on page 101.

For additional information about supported hardware for this platform and release, see the Cisco Software Advisor at the following location:

http://tools.cisco.com/Support/Fusion/FusionHome.do

Table 10 lists the supported feature boards for the Cisco AS5850 universal gateway for Cisco IOS Release 12.4T.

Table 10 Supported Feature Boards for the Cisco AS5850 Universal Gateway

Feature Boards	Product Description
ERSC	Enhanced Route Switch Controller Card
RSC	Route Switch Controller Card
Port Handling Cards	AS58-324UPC-CC
LAN Interfaces	Dual Fast Ethernet 10/100BASE-T (RJ-45) per ERSC
	Dual Gigabit Ethernet
	Dual Gigabit Ethernet per RSC and ERSC
	Fast Ethernet 10/100BASE-T (RJ-45)[1]
	Single Fast Ethernet 10/100BASE-T (RJ-45) per RSC

Table 10 Supported Feature Boards for the Cisco AS5850 Universal Gateway (Continued)

Feature Boards	Product Description
WAN Interface Options	Channelized T1 (AS58-24CT1)
	Channelized T3 (AS58-1CT3/216U)
	Channelized E1 (AS58-24CE1)
	Channelized STM1 (AS58-STM1)

1. The Fast Ethernet is for management purposes only.

Feature Support

For feature support in Cisco IOS Release 12.4T, see the "Feature Support" section on page 7.

Cisco Catalyst 6000/Cisco 7600 Multiprocessor WAN Application Module

This section contains the following sections with information that is specific to the Cisco Catalyst 6000/Cisco 7600 multiprocessor WAN application module:

- Introduction, page 88
- Memory Recommendations, page 88
- Supported Hardware, page 88
- Feature Support, page 88

Introduction

The Cisco multiprocessor WAN application module (MWAM) provides three processor complexes with dual processors used in two of the complexes and a single processor used in the remaining processor complex. This architecture provides five mobile wireless applications on one module.

The MWAM does not provide external ports but is connected to the switch fabric in the Cisco Catalyst 6500/Cisco 7600 chassis. An internal Gigabit Ethernet port provides an interface between each processor complex and the Supervisor module. VLANs direct traffic from external ports via the Supervisor module to each mobile wireless application instance.

The MWAM provides an interface to the Cisco IOS image on the Supervisor module. The Supervisor module software enables a single session to be established to each application on the MWAM in the chassis. Each session is used for configuring, monitoring, and troubleshooting application. For information on establishing sessions to mobile wireless application instances on the MWAM, see the *MWAM User Guide for Mobile Wireless Applications*:

http://www.cisco.com/univercd/cc/td/doc/product/core/cis7600/cfgnotes/servmod/mwam_ug/index.htm

The software image that provides the mobile wireless application feature is downloaded through the Supervisor module and distributed to each processor complex on the MWAM(s). The same image is installed on all the processors in the MWAM.

Memory Recommendations

For memory recommendations for the Cisco Catalyst 6000/Cisco 7600 multiprocessor WAN application module in Cisco IOS Release 12.4T, see the "Memory Recommendations" section on page 8.

Supported Hardware

Cisco IOS Release 12.4T supports the Cisco Catalyst 6000/Cisco 7600 Multi-Processor WAN Application Module.

Feature Support

For feature support in Cisco IOS Release 12.4T, see the "Feature Support" section on page 7.

Cisco Catalyst 6500/Cisco 7600 Communication Media Module

This section contains the following sections with information that is specific to the Cisco Catalyst 6500/Cisco 7600 communication media module:

- Introduction, page 89
- Memory Recommendations, page 89
- Supported Hardware, page 89
- Feature Support, page 91
- Additional Notes for the Cisco Catalyst 6500/Cisco 7600 Communication Media Module, page 91

Introduction

Cisco communication media module voice features for Cisco Catalyst 6500 series and Cisco 7600 series devices provide support for new features that provide interoperability between the Cisco Catalyst 6500 series and Cisco 7600 series router communication media module (CMM) and Cisco gateway platforms.

Memory Recommendations

For memory recommendations for the Cisco Catalyst 6500/Cisco 7600 communication media module in Cisco IOS Release 12.4T, see the "Memory Recommendations" section on page 8.

Supported Hardware

The Cisco Catalyst 6500/Cisco 7600 communication media module requires either a Supervisor Engine 1, Supervisor Engine 2, Supervisor Engine 32, or Supervisor Engine 720. The supervisor engine can have an MSFC, MSFC2, or MSFC3, but CMM does not require one for configuration or operation. Software recommendations are listed in Table 11.

For Supervisor Engine 32, Cisco recommends Cisco Catalyst Release 8.4(1) or a later release.

Table 11 Software Recommendations for the Communication Media Module

Product Number	Product Description	Minimum Software Version	Recommended Software Version	Minimum Cisco Catalyst Cisco IOS Release	Minimum Cisco Catalyst OS Release
WS-SVC-CMM	Communication media module	12.3(14)T	12.3(14)T	12.1(19)E	7.6(12)[1]

1. For Supervisor Engine 32, Cisco recommends Cisco Catalyst Release 8.4(1) or a later release.

Software Requirements

Cisco Catalyst 6500/Cisco 7600 Communications Media Module has software requirements for both Cisco IOS support and Cisco CallManager support.

Cisco IOS Support

Note

- CMM has its own software image; the image is not bundled with the supervisor engine or MSFC images. See the "Additional Notes for the Cisco Catalyst 6500/Cisco 7600 Communication Media Module" section on page 91 for instructions on downloading the image to the CMM flash memory.
- Supervisor Engine 720 requires the CMM to run Cisco IOS Release 12.3(8)XY4 or a later release.
- Supervisor Engine 720-3B/3BXL requires the CMM to run Cisco IOS Release 12.3(8)XY4 or a later release.

The software requirements for CMM to support Voice Features for Cisco IOS Release 12.3(14)T are as follows:

- Catalyst Release 7.6(12) is the minimum Catalyst Supervisor Engine software release., Cisco recommends Release 8.2(1) or a later release.
- Cisco IOS Release 12.1(19)E is the minimum release, Cisco IOS Release 12.1(20)E is recommended.
- Online diagnostic features require the following:
  - For Cisco Catalyst 6500/Cisco 7600 Supervisor Engine running Catalyst OS, Catalyst Release 8.1 or a later release is required.
  - For Cisco Catalyst 6500/Cisco 7600 Supervisor Engine running Cisco IOS, Cisco IOS Release 12.2(18) or a later release is required.

The software requirements for CMM to support all other features are as follows:

- Cisco Catalyst software release:
  - Supervisor Engine 1 and Supervisor Engine 2—Refer to the *Memory Recommendations and Requirements* section in the *Catalyst 6500 Series Supervisor Engine 1A DRAM Upgrade Installation Note* for Supervisor Engine 1 and to the *Memory Recommendations and Requirements* section in the for Supervisor Engine 2 for the minimum and recommended memory requirements.
  - Supervisor Engine 720—Refer to the Supervisor Engine documentation for the minimum and recommended memory requirements.
- •Cisco IOS Release:
  - Supervisor Engine 1 and Supervisor Engine 2— Minimum release is Cisco IOS Release 12.1(19)E, and the recommended release is Cisco IOS Release 12.1(20)E.
  - Supervisor Engine 720—Minimum software is the Cisco IOS Release 12.2(14)SX, and the recommended release is Cisco IOS Release 12.2(17)SX.

Note If your system is running Cisco IOS software on both the supervisor engine and the MSFC, the following images are available: sup11, sup12, sup22, and s720.

- SNMP is supported with Cisco IOS Release 12.4.

Cisco CallManager Support

Cisco IOS Release 12.4 supports Cisco CallManager Release 3.2(2) and later releases.

Feature Support

For feature support in Cisco IOS Release 12.4T, see the "Feature Support" section on page 7.

Additional Notes for the Cisco Catalyst 6500/Cisco 7600 Communication Media Module

This section contains important information about using the Cisco Catalyst 6500/Cisco 7600 Communication Media Module with Cisco IOS Release 12.4T software.

Release Upgrade Notice

The CMM wscmm-i6s-mz.123-14.T image contains a new bundle 4.4.X DSPware infrastructure. Once downloaded, this software will perform an automatic FPGA upgrade to version 10 (hex 0xA) in order to take advantage of the new bundle 4.4.X DSPware infrastructure.

After the upgrade, power-cycling the CMM is required. If you have an ACT module on the CMM, you must reconfigure the ACT module with the new Fast Ethernet interface instead of Ethernet. Any other CMM release before the wscmm-i6s-mz.123-14.T image will require an automatic bundle FPGA upgrade to version 10 (hex 0xA).

The ACT module supports the following features.

Supported Features for WS-SVC-CMM-ACT	Capacity per ACT
Maximum channels for conference	128
Maximum channels for transcoding	128
Maximum channels for MTP	512[1]
Maximum port adapters for CMM	4
Maximum capacity for CMM	512 conference or transcode, 2048 MTP channels[2]
Largest conference size	64 parties
Voice codecs	G.711 mu-law and a-law, G.729, G.723
Packetization	10, 20, 30, 60 ms
Protocols	SCCP with Cisco CallManager
Maximum number of conferences	64[3]

1. Requires two channels per session.
2. With MTP-only mode at G.711.
3. With two-party MeetMe conference with Cisco CallManager (typical ad-hoc conference has three parties).

Detailed Installation and Configuration Procedures

For detailed installation and configuration procedures, see the *Catalyst 6500 Series and Cisco 7600 Series CMM Installation and Configuration Note* at the following URL:
http://www.cisco.com/univercd/cc/td/doc/product/lan/cat6000/cfgnotes/78_14107.htm

For detailed information on automatically upgrading and downgrading feature cards FPGA, see the *Release Notes for the Cisco Catalyst 6500 Series and the Cisco 7600 Series Communication Media Module for Cisco IOS Release 12.3(8)XY* at the following URL:

http://www.cisco.com/univercd/cc/td/doc/product/lan/cat6000/relnotes/ol_6314.htm

Cisco 7000 Series Routers

This section contains the following sections with information that is specific to the Cisco 7000 series router:

- Memory Recommendations, page 92
- Supported Hardware, page 92
- Feature Support, page 92

Memory Recommendations

For memory recommendations for the Cisco 7000 series routers in Cisco IOS Release 12.4T, see the "Memory Recommendations" section on page 8.

Supported Hardware

Cisco IOS Release 12.4T supports the following Cisco 7000 series routers:

- Cisco 7200 routers
- Cisco 7200-Networking Processing Engine (NPE-G2)
- Cisco 7201 routers (introduced in Cisco IOS Release 12.4(15)T1)
- Cisco 7301 routers
- Cisco 7400 routers (not supported in Cisco IOS Release 12.4(20)T and later releases)

For detailed descriptions of the new hardware features, see the "New and Changed Information" section on page 101.

For additional information about supported hardware for this platform and release, see the Cisco Software Advisor at the following location:

http://tools.cisco.com/Support/Fusion/FusionHome.do

Feature Support

For feature support in Cisco IOS Release 12.4T, see the "Feature Support" section on page 7.

Cisco 7600 Service and Application Module for IP (SAMI)

This section contains the following sections with information that is specific to the Cisco 7600 SAMI:

- Introduction, page 93
- Memory Recommendations, page 93
- Supported Hardware, page 93
- Feature Support, page 93

Introduction

The Cisco Service and Application Module for IP (SAMI) is a high performance, Cisco IOS software application module that occupies one slot in the Cisco 7600 series router platform.

With an IXP2800 network processor flow-distributor running at 1.4 GHz, and six PowerPCs (PPCs) running at 1.25 GHz, each of which runs an instance of the same Cisco IOS image, the SAMI offers a parallel architecture for Cisco software applications such as the Cisco Content Services Gateway - 2nd Generation (CSG2), the Cisco Gateway GPRS Support Node (GGSN), and the Cisco Mobile Wireless Home Agent (HA).

The benefits of the Cisco SAMI architecture over the Cisco Multiprocessor WAN Application Module (MWAM) include:

- Increased processing power and session density
- Reduced inter-CPU data sharing
- Separation of the control and the data plane
- Improved management capabilities
- Easier to configure and troubleshoot

Memory Recommendations

For memory recommendations for the Cisco 7600 SAMI in Cisco IOS Release 12.4T, see the "Memory Recommendations" section on page 8.

Supported Hardware

This section provides an overview of the hardware of the Cisco 7600 SAMI.

For detailed descriptions of the new hardware features, see the "New and Changed Information" section on page 101.

For additional information about supported hardware for this platform and release, see the Cisco Software Advisor at the following location:

http://tools.cisco.com/Support/Fusion/FusionHome.do

Feature Support

For feature support in Cisco IOS Release 12.4T, see the "Feature Support" section on page 7.

Cisco IGX 8400 Series URM

This section contains the following sections with information that is specific to the Cisco IGX 8400 series Universal Router Module (URM):

- Introduction, page 94
- Memory Recommendations, page 94
- Supported Hardware, page 94
- Feature Support, page 96

Introduction

Cisco has supported the Cisco IGX 8400 series platforms since Cisco IOS Release 12.1(5)YA. The Cisco IGX 8400 series platforms can now function as components of Cisco end-to-end voice architecture. The Cisco IOS software runs only on the URM; all other components of the Cisco IGX 8400 series platforms run Switch Software (SWSW). The minimum SWSW release to support URM is 9.3.20.

The URM is a Cisco IOS software-based IP router blade that enables users to provision Voice over IP (VoIP), Voice over ATM (VoATM), Multiprotocol Label Switching (MPLS), and IP services on a Cisco IGX 8400 series platform. The voice and routing capabilities of the URM have been derived from the Cisco 3660 series routers, and the ATM capabilities of the URM have been derived from the existing enhanced universal switching module (UXM-E) that is used on the Cisco IGX 8400 series platform.

Additionally, Cisco IOS command-line interface (CLI) commands are now available on the Cisco IGX 8400 series platforms, which allows configuration of IP services.

The URM interoperates with all Cisco IOS software-based voice products and supports 30 voice channels with high-complexity codec types and 60 voice channels with medium-complexity codec types.

Note Only digital voice ports are supported on the URM; analog ports are not supported.

Memory Recommendations

For memory recommendations for the Cisco IGX 8400 series URM in Cisco IOS Release 12.4T, see the "Memory Recommendations" section on page 8.

Supported Hardware

This section provides an overview of the hardware of the Cisco IGX 8400 series switches and the URM.

For detailed descriptions of the new hardware features, see the "New and Changed Information" section on page 101.

For additional information about supported hardware for this platform and release, see the Cisco Software Advisor at the following location:

http://tools.cisco.com/Support/Fusion/FusionHome.do

IGX Switches

Like other Cisco WAN switches, the IGX switch operates in public or private WANs. An IGX switch can support OC-3, T3, E3, T1, E1, inverse multiplexing over ATM (IMA) for T1 or E1, fractional T1 or E1, or subrate digital transmission facilities. The IGX cell relay technology provides maximum throughput with minimum delays. Cell relay performance characteristics are the core of efficient digital networks and make the IGX switch an ideal choice for a multimedia platform. Key features of the IGX switch include:

- A 1-Gbps Cellbus for high-speed switching and a redundant 0.2-Gbps bus for backup.
- Full compatibility with BPX system software.
- Up to 64 lines, 32 trunks, and 3500 terminating connections on the Cisco IGX 8410, Cisco IGX 8420, and Cisco IGX 8430.
- IGX configuration and management through Cisco WAN Manager or the same standard user interface used with the BPX WAN switching system software.
- High-performance switching suitable for a variety of protocols and applications, including channel-associated signaling (CAS), ATM, Frame Relay, voice, fax, slow-scan and full-bandwidth video, and synchronous or asynchronous data.
- Six cabinet models:
  - An 8-slot standalone unit (Model 8410, standalone)
  - An 8-slot rack-mount unit (Model 8410, rack-mount)
  - A 16-slot standalone unit (Model 8420, standalone)
  - A 16-slot rack-mount unit (Model 8420, rack-mount)
  - A 32-slot standalone unit (Model 8430, standalone)
  - A 32-slot rack-mount unit (Model 8430, rack-mount)
- Redundancy of controller cards, service module cards, system buses, and power supplies to provide hardware reliability.
- Hot-swappable modules to facilitate nonstop operation: service cards, processor modules, AC and DC power, and fan tray assembly.
- 110/220 VAC and –48 DC power options for use in varied network environments.

Universal Router Module

The URM is an optional module for the Cisco IGX 8400 series and delivers high-density voice interfaces, Fast Ethernet connectivity, and ATM switching. The URM consists of the following cards:

- One URM front card. The 1-slot-wide front card contains an embedded UXM-E and an embedded router (based on the Cisco 3660 series router) running Cisco IOS software. The front card integrates all memory components, including Battery-Backed RAM (BRAM) and flash memory for the storage of Cisco IOS software.
- URM back card options. All back cards are one slot wide. The following two options are for back cards that support voice:
  - BC-URI-2FE2VT1, providing two T1 ports (RJ-48), two 10/100BASE-T Fast Ethernet ports (RJ-45), and one console port (RJ-45)
  - BC-URI-2FE2VE1, providing two E1 ports (RJ-48), two 10/100BASE-T Fast Ethernet ports (RJ-45), and one console port (RJ-45)

The following option is for a data-only back card:

- BC-URI-2FE, providing two 10/100BASE-T Fast Ethernet ports (RJ-45) and one console port (RJ-45)

The URM can connect to another Cisco router in the following ways:

- Through its 155-Mbps ATM interface to the IGX backplane (ATM-to-ATM [URM-to-UXM] or ATM/FR SIW [URM-to-UFM] connections can be established with SWSW)
- Through its two Fast Ethernet ports
- Through its two T1 or E1 ports (only on the data/voice back cards)

Feature Support

For feature support in Cisco IOS Release 12.4T, see the "Feature Support" section on page 7.

Cisco MGX 8850 Route Processor Modules (RPM-PR and RPM-XF)

This section contains the following sections with information that is specific to the Cisco MGX 8850 Route Processor Module:

- Memory Recommendations, page 97
- Feature Support, page 97

Memory Recommendations

For memory recommendations for the Cisco MGX 8850 in Cisco IOS Release 12.4T, see the "Memory Recommendations" section on page 8.

Feature Support

For feature support in Cisco IOS Release 12.4T, see the "Feature Support" section on page 7.

Cisco Signaling Link Terminals

This section contains the following sections with information that is specific to the Cisco Signaling Link Terminal:

- Introduction, page 98
- Memory Recommendations, page 99
- Supported Hardware, page 99
- Feature Support, page 100

Introduction

The Cisco Signaling Link Terminal (SLT) enables service providers to reliably transport Signaling System 7 (SS7) protocols across an IP network. The Cisco SLT uses the Cisco IOS SS7 Signaling Link Terminal feature set, providing reliable interoperability with the Cisco PGW 2200 Softswitch. The Cisco SLT is responsible for terminating the Message Transfer Part (MTP) 1 and MTP 2 layers of the SS7 protocol stack. Using the Cisco Reliable User Datagram Protocol (RUDP), the Cisco SLT backhauls, or transports, upper-layer SS7 protocols across an IP network to the Cisco PGW 2200 Softswitch.

In combination with this application-specific version of the Cisco IOS software, the Cisco SLT hardware component leverages the Cisco 2600XM series multiservice access router. The Cisco 2600XM series, driven by a RISC processor, provides the high performance required in complex networking infrastructures.

Note When used as a Cisco Signaling Link Terminal device with a Cisco PGW 2200 Softswitch, the Cisco 2611XM and Cisco 2651XM have only SS7 functionality; all standard Cisco 2611XM and Cisco 2651XM software features are disabled when the Cisco SLT image is run.

When used for Signaling Link Terminal applications, the modular Cisco 2611XM and Cisco 2651XM dual-Ethernet port routers can be configured with dual serial and the multiflex interface cards. The E1 multiflex interface cards offer integrated DSUs, and the T1 multiflex interface cards offer integrated CSU/DSUs. For additional flexibility, the multiflex interface cards can also be ordered with a dual-port drop-and-insert capability. All of these interface cards are field-replaceable units (FRUs).

The Cisco SLT supports only the SS7 MTP 2 serial protocol. Therefore, the serial interfaces cannot be configured for other protocols such as HDLC, PPP, X.25, LAPB, and Frame Relay.

Memory Recommendations

For memory recommendations for the Cisco Signaling Link Terminal in Cisco IOS Release 12.4T, see the "Memory Recommendations" section on page 8.

Supported Hardware

The Cisco SLT feature in Cisco IOS Release 12.4T supports the Cisco 2611XM and Cisco 2651XM routers exclusively. The Cisco SLT feature is not supported with any other Cisco 2600 series chassis. For more information about the Cisco 2600 series in Cisco IOS Release 12.4T, see the "Cisco 2600XM Series and Cisco 2691 Modular Access Routers" section on page 42.

For detailed descriptions of the new hardware features, see the "New and Changed Information" section on page 101.

For additional information about supported hardware for this platform and release, see the Cisco Software Advisor at the following location:

http://tools.cisco.com/Support/Fusion/FusionHome.do

Table 12 lists the supported interfaces for the Cisco SLT solution data rate.

Table 12 Supported Interfaces for the Cisco SLT Solution Data Rate

Interface, Network Module, or Data Rate[1]	Product Description	Other Platforms Supporting These Modules
LAN Interfaces	2-port Ethernet (10BASE-T)	Cisco 2611XM
	2-port Ethernet (10/100BASE-T)	Cisco 2651XM
E1/T1 Multiflex Voice/WAN Interface Cards	1-port T1 multiflex trunk interface (VWIC-1MFT-T1)	All Cisco 2600 series platforms
	1-port E1 multiflex trunk interface (VWIC-1MFT-E1)	All Cisco 2600 series platforms
	2-port T1 multiflex trunk interface (VWIC-2MFT-T1)	All Cisco 2600 series platforms
	2-port E1 multiflex trunk interface (VWIC-2MFT-E1)	All Cisco 2600 series platforms
	2-port T1 multiflex trunk interface with drop and insert (VWIC-2MFT-T1-DI)	All Cisco 2600 series platforms
	2-port E1 multiflex trunk interface with drop and insert (VWIC-2MFT-E1-DI)	All Cisco 2600 series platforms
WAN Interface Cards	1-port high-speed serial (up to 2.048 Mbps)	All Cisco 2600 series platforms
	2-port dual high-speed serial (up to 2.048 Mbps; asynchronous/synchronous support)	All Cisco 2600 series platforms
	1-port serial with 4-wire 56/64-kbps CSU/DSU interface card (WIC-1DSU-56K4)	All Cisco 2600 series platforms

1. See E1/T1 multiflex voice/WAN interface cards in this table.

Feature Support

For feature support in Cisco IOS Release 12.4T, see the "Feature Support" section on page 7.